

SUSTAINABLE CONSUMPTION AND PRODUCTION

IN THE ASIA-PACIFIC REGION

EFFECTIVE RESPONSES IN A RESOURCE CONSTRAINED WORLD



IGES WHITE PAPER III 2010

TOWARDS A SUSTAINABLE ASIA-PACIFIC

THE INSTITUTE FOR GLOBAL ENVIRONMENTAL STRATEGIES
CONDUCTS POLICY-ORIENTED AND PRACTICAL
"STRATEGIC RESEARCH" ON GLOBAL ENVIRONMENTAL ISSUES
TO ACHIEVE SUSTAINABLE DEVELOPMENT.

SUSTAINABLE CONSUMPTION AND PRODUCTION IN THE ASIA-PACIFIC REGION

Effective Responses in a Resource Constrained World

IGES White Paper III 2010

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**Sustainable Consumption and Production in the Asia-Pacific Region
Effective Responses in a Resource Constrained World
IGES White Paper III 2010**

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Foreword

The Institute for Global Environmental Strategies (IGES) White Paper series has been designed to extract broad findings from research conducted by IGES and its partner research institutes to bring critical sustainable development policy issues to the attention of the region's policy makers. While the need for sustainable consumption and production (SCP) has been viewed for a long time as an essential element of sustainable development, most of the emphasis in the past has been on cleaner production. Sustainable consumption has had relatively little research in Asia, perhaps reflecting that economic development and poverty alleviation were higher priority issues than trying to redirect consumption patterns.

As Asia and the Pacific continues its economic growth, however, an emerging middle class, increasingly urbanised, is beginning to change traditional consumption patterns, influenced by global advertising and media perspectives of the "good life." If the growing population of Asia and the Pacific was to eventually consume in the same way as the average American or European, then resources to satisfy the demand would far surpass those available on Earth and the environment would be damaged to possibly irreversible levels. Hence, not only does the developed world need to radically change its current consumption patterns but also the developing world needs to find its own sustainable consumption path.

The third White Paper consists of five main sections. Section I puts forward an overarching hypothesis that sustainable consumption can drive sustainable production and lead to structural changes in the Asian economy, which in turn will form a virtuous circle and encourage ever-increasing sustainable consumption. The second section of the White Paper examines the roles of key stakeholders – consumers, communities, local governments and businesses, as well as the policy role of national governments in creating appropriate incentives for change in this direction. The third section examines sustainable consumption and production in four key sectors – agriculture, forestry, water resources, and energy. The fourth section of the White Paper examines cross-cutting themes of climate change and regional integration. The final chapter then attempts to pull together these diverse strands and to present a coherent set of policy options that will assist Asia-Pacific to accelerate the urgent need to move towards SCP.

The main objectives of the third White Paper are:

- (i) to feature a critically important sustainable development policy agenda for the Asia-Pacific region—sustainable consumption and production;
- (ii) to broadly summarise the consumption and production situation in Asia-Pacific, identify emerging issues, and review effective policy approaches that have been adopted in the region;
- (iii) to analyse and present broad policy recommendations that will promote sustainable consumption and production, drawing from ongoing IGES research programmes, where appropriate; and
- (iv) to identify the critical policy research agenda related to sustainable consumption and production over the next decade for the region.

The third White Paper was drafted throughout FY2009, with an official publication launch in conjunction with the IGES International Forum for a Sustainable Asia and the Pacific, held from 12-13 July 2010, in Yokohama, Japan.

I would like to acknowledge the efforts of a group of expert peer reviewers, who provided constructive input and advice on early drafts of the White Paper. I am also grateful to the members of the IGES Board of Directors and Board of Trustees who reviewed the draft and provided invaluable input. My earnest appreciation goes to the multiple authors of the various chapters who have worked tirelessly on the White Paper in addition to their other research activities. Drafting and refining the key concepts has been carried out at IGES retreats over the last year, throughout which Prof. Akio Morishima, special research advisor to IGES, provided sound, practical advice. The drafting process was coordinated by Mr. Hideyuki Mori, President of IGES, Mr. Robert Kipp and Dr. Peter King, with full participation of all IGES projects. Finally, the excellent work of the IGES Secretariat and their selected editors and translators has ensured a high quality publication with which we hope to make a real contribution to ongoing policy debates on sustainable consumption and production in the Asia-Pacific region.

Hayama, Japan
May 2010

Prof. Hironori Hamanaka
Chair, Board of Directors
Institute for Global Environmental Strategies

Opening Remarks

The third White Paper in the IGES series tackles the increasingly important and difficult issue of sustainable consumption and production. Many people in Asia and the Pacific feel that it is now their “turn” to consume goods and services as profligately as consumers in the developed world have done for many decades. They feel that it is morally wrong to criticise consumers in Asia-Pacific, just because their new-found “wealth” allows them to increase their consumption, while allowing consumers in the developed world to continue their own consumption behaviour. While acknowledging this shift in consumption behaviour, as Asia-Pacific becomes increasingly urbanised, it is also a reality that it is physically impossible for the burgeoning population in the region to consume goods and services to the extent of the average American or European—several new planets would be needed to provide the corresponding level of resources and the environment on Earth could not withstand the waste products produced.

What is needed now, well before unsustainable consumption patterns in Asia-Pacific become entrenched, is a better understanding of what a sustainable consumption and production pathway would look like in this region, and what kinds of policies need to be implemented by the region’s governments to avoid the likely “business-as-usual” outcomes. These policies may include taking a leadership role by mandating green procurement for all government purchases, providing subsidies or other incentives to promote sustainable consumption alternatives (e.g. car sharing or tele-commuting), using information campaigns to convince people that consumption of services (e.g. libraries) is preferable to consumption of products, or myriad other policies that are explored in the subsequent chapters of the White Paper.

Along with Professor Hamanaka, I applaud all of the hard work that has gone into production of the third White Paper by IGES staff and associated researchers, the assistance of the Secretariat in organising translation and production, and our external reviewers and Board members for their valuable advice and suggestions. I acknowledge the excellent supervision of the drafting and production process and keeping it all on time by Robert Kipp and Peter King, as well as the invaluable advice from Professor Akio Morishima. I look forward to the launch of the White Paper at the International Forum for a Sustainable Asia and the Pacific in July 2010 and welcome feedback from readers and users of the White Paper, so that we can continuously strive to improve IGES’ contribution to the policy environment in Asia and the Pacific.

Hideyuki Mori
President
IGES

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Abbreviations and Acronyms

Note: All "\$" express the currency of the United States of America. Other currencies are as indicated.

10YFP	Ten-Year Framework of Programmes
3R	Reduce, Reuse, and Recycle
ACCA	Association of Chartered Certified Accountants
ADB	Asian Development Bank
ADRA	Adventist Development and Relief Agency, China
AIO 2000	Asian Input-Output Table 2000
AOX	Absorbable Organic Halides
APFED	Asia-Pacific Forum for Environment and Development
APRSCP	Asia Pacific Roundtable for Sustainable Consumption and Production
AR4	Fourth Assessment Report (IPCC)
ASEAN	Association of Southeast Asian Nations
AsRIA	Associate for Sustainable and Responsible Investment in Asia
BARI	Bangladesh Agricultural Research Institute
BAU	Business-As-Usual
BOD	Biochemical Oxygen Demand
BRIC	Forestry Industry Revitalization Agency - Indonesia
BRT	Bus Rapid Transit
CBRC	China Banking Regulatory Commission
CCP	Cities for Climate Protection
CDM	Clean Development Mechanism
CEID	Corporate Environmental Information Disclosure
CER	Corporate Environmental Reporting
CERs	Certified Emission Reductions
CFL	Compact Fluorescent Lamp
CGE	Computable General Equilibrium
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
Cl	Chlorine
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalent
CoC	chain of custody
COD	Chemical Oxygen Demand
Codex	Codex Alimentarius

CSCP	Centre on Sustainable Consumption and Production
CSD	Commission on Sustainable Development of the United Nations
CSE	Centre for Science and Environment
CSR	Corporate Social Responsibility
CSWMB	Bago City Solid Waste Management Board
DAP	Deutsches Akkreditierungssystem Prüfwesen
DEFRA	Department for Environment, Food and Rural Affairs, UK
DESD	UN Decade of Education for Sustainable Development (2005-2014)
DFID	Department for International Development, UK
DIY	Do It Yourself
EAS	East Asia Summit
EC	European Commission
EE	Environmental Education
EFA	Education for All
EIA, US	Energy Information Administration
EIA	Environmental Impact Assessment
EMAS	Eco-Management and Audit Scheme
EOP	End of Pipe
EPA	Environmental Protection Agency
EPFI	Equator Principles Financial Institutions
EPR	Extended Producer Responsibility
EREC	European Renewable Energy Council
ESC	Education for Sustainable Consumption
ESCAP	Economic and Social Commission for Asia and the Pacific of the United Nations
ESD	Education for Sustainable Development
EU	European Union
EuroSIF	Euro Social Investment Forum
FAO	Food and Agriculture Organisation of the United Nations
FLEGT	Forest Law Enforcement, Governance and Trade
FoSIM	Food Safety Information System of Malaysia
FSC	Forest Stewardship Council
G8	Group of Eight (developed countries)
GAP	Good Agricultural Practice
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GMS	Greater Mekong Subregion
GRI	Global Reporting Initiatives
GRP	Green Rating Project
GTZ	German Agency for Technical Cooperation
GW	Gigawatt

GWh	GigaWatt per Hour
HACCP	Hazard Analysis and Critical Control Point System
IAASTD	International Assessment of Agricultural Knowledge, Science and Technology for Development
ICLEI	International Council for Local Environmental Initiatives
IEA	International Energy Agency
IFOAM	International Federation of Organic Agricultural Movements
IGES	Institute for Global Environmental Strategies
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
IPM	Integrated Pest Management
IPP	Integrated Product Policy
ITF	International Task Force on Harmonization and Equivalence in Organic Agriculture
ITP	Institute for Transportation and Development Policy
ITTO	International Tropical Timber Organisation
JAS	Japanese Agricultural Standard
JFWIA	Japan Federation of Wood Industry Associations
JNNURM	Jawaharlal Nehru National Urban Renewal Mission
KRC/IGES	Kansai Research Centre/Institute for Global Environmental Strategies
LA21	Local Agenda 21
LCA	Life-Cycle Assessment
LCCM	Life Cycle Carbon Minus
LCS	Low Carbon Society
LLEE	Live and Learn Environmental Education, Fiji
LPG	Liquefied Petroleum Gas
M&E	Monitoring and Evaluation
MARDO	Marsyangdi Rural Development Organisation, Nepal
MDG	Millennium Development Goals
MEP	Ministry of Environmental Protection, China
MJ	Megajoule
MoFor	Ministry of Forestry, Indonesia
MRF	Materials Recovery Facility
MRIO	Multi-Region Input-Output
MSW	Municipal Solid Waste
MWth	Megawatt Thermal
NAMA	Nationally Appropriate Mitigation Action
NATO	North Atlantic Treaty Organization
NEA	Northeast Asia
NetRes	Pacific Network of Policy Research Institutes for Environmental Management and Sustainable Development
NGO	Non-Government Organization
NOP	National Organic Program

OCIA	Organic Crop Improvement Association
OECD	Organisation for Economic Cooperation and Development
OLIA	Organic and Low Input Agriculture
OPEC	Organization of the Petroleum Exporting Countries
PA	Principal-Agent
PCB	Polychlorinated Biphenyl
PCD	Pollution Control Department
PEFC	Programme for the Endorsement of Forest Certification
PER	Process Energy Requirements
PLN	Indonesian National Electricity Company
PPP	Purchasing Power Parity
PROPER	Program for Pollution Control, Evaluation and Rating
PRP	Packaging Review Panel
PRTR	Pollutant Release and Transfer Register
PV	Photovoltaic
R&M	Renovation and Modernisation
REN21	Renewable Energy Policy Network for the 21st Century
REPA	Regional Environmental Policy Assessment
RIL	Reduced Impact Logging
RISPO	Research on Innovative and Strategic Policy Options
RPS	Renewable Portfolio Standards
SAARC	South Asian Association for Regional Cooperation
SBCI	Sustainable Building and Construction Initiative
SC	Sustainable Consumption
SCONTE	Society for the Conservation of National Treasure and Environment, Thailand
SCP	Sustainable Consumption and Production
SEPA	State Environmental Protection Administration, China
SFA	State Forestry Administration of China
SFM	Sustainable Forest Management
SGEC	Sustainable Green Ecosystem Council
SKSHH	Certificate of Legal Forest Products, Indonesia
SME	Small- and Medium-Size Enterprise
SNI	Standard National Indonesia
SRI	Socially Responsible Investors
TEI	Thailand Environment Institute
TGO	Thailand Greenhouse Gas Management Organization
TRI	Toxic Release Inventory
TSS	Total Suspended Solids
TWh	Terrawatt hour
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNCSD	United Nations Commission on Sustainable Development

UNCTAD	United Nations Conference on Trade and Development
UN-DESA	United Nations – Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNLD	United Nations Literacy Decade
US	United States of America
USDA	United States Agriculture Department
VAT	Value Added Tax
VPA	Voluntary Partnership Agreement
WB	World Bank Group
WBCSD	World Business Council for Sustainable Development
WCED	World Commission on Environment and Development
WCS	Wildlife Conservation Society, Cambodia
WEO	World Energy Outlook
WHO	World Health Organization
WSSD	World Summit on Sustainable Development
WTO	World Trade Organization
YCELP	Yale Center for Environmental Law and Policy

Executive Summary

1. Introduction

This White Paper explores issues in sustainable consumption and production (SCP) in the Asia-Pacific region and provides unique insights on stakeholder roles, natural resources, and transboundary issues in light of SCP. Although both consumption and production are intertwined, when talking about sustainability in the region, the primary focus here is on sustainable consumption, as there has been considerable research over the past few decades on sustainable production, but relatively little on sustainable consumption. The aim of this White Paper is to bring together diverse perspectives on SCP by looking at key roles for various stakeholder groups, providing effective policy recommendations and clarifying enabling conditions which will support growth of SCP in Asia-Pacific.

The purpose is to support policymakers, researchers, and practitioners by stimulating policy making and project implementation, and further research and discourse through the insights and recommendations in this paper.

The first part of this White Paper puts forward an overarching hypothesis that sustainable consumption can drive sustainable production and lead to structural changes in the Asian economy, which in turn will form a virtuous circle and encourage ever-increasing sustainable consumption. An overriding theme of this White Paper is to embrace the complexity of consumption and production—processes and policies—and to rely on context in creating an effective policy mix.

The second part of the White Paper examines the roles of key stakeholders—consumers, communities, local governments and businesses, as well as the policy role of national governments in creating appropriate incentives for change in this direction. The third part of the White Paper examines SCP in four key sectors—agriculture, forestry, water resources, and energy. The fourth part of the White Paper examines SCP in the context of cross-cutting themes of climate change and regional integration. The final chapter then aims to pull together these diverse strands and outlines a coherent set of policy options that will assist Asia to accelerate the urgent need to move towards SCP.

Sustainable consumption is defined by the United Nations Environment Programme as “the use of services and related products which respond to basic needs and bring a better quality of life while minimising the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life-cycle so as not to jeopardise the needs of future generations”.

Sustainable production is defined by the Lowell Center for Sustainable Production as “the creation of goods and services using processes and systems that are non-polluting, conserve energy and natural resources, are economically efficient, are safe and healthy for workers, communities, and consumers, and are socially and creatively rewarding for all working people”.

2. Megatrends and driving forces

2.1 Globalisation

Consumption and production systems now have connections that stretch around the world, linked by resource supplies, global trade, tourism, and information technology. The 21st century is poised to become the Asian Century, as Asia continues on its steady path of becoming the major production centre for the world, and a region of major consumption. China has recently replaced Germany as the world's third largest economy and its breakneck development pace is placing enormous global pressures on natural resources, environmental sinks, and fossil fuels (with accompanying greenhouse gas [GHG] emissions responsible for climate change). India is fast catching up, with these two countries alone accounting for more than one third of the global population.

2.2 Urbanisation

Globally, the urban population grew to an estimated 3.17 billion or 49% of the population in 2005, up from 29% in 1950. While urbanisation is occurring in virtually all developing countries, Asia is now considered as its centre. From 1950 to 2005, the urban population in Asia increased nearly seven times, equivalent to about 40% of the total population. By 2030, almost 55% of the region's population will be urban. This phenomenal rate of urbanisation has major implications for energy and other resources. For example, energy consumption has grown rapidly over the last three decades in Asia. As a result, the region's share of the world total primary energy supply (TPES) increased from 18% in 1971 to 34% in 2007. Fuelled by emerging economies like China and India, whose combined share accounted for about 19% of the world's total energy consumption in 2006, energy demand in the region is estimated to grow by 45% between 2006 and 2030.

2.3 Lifestyle aspirations

The Asia-Pacific region is already home to more than 680 million middle-to-high income consumers, earning above \$7,000 per capita. If the emerging middle class in Asia decides to consume like the average American, the world will need four to five additional planets to meet their resource-use needs. Traditionally, Asians have been savers rather than spenders, but that may be changing. By the end of 2008, Kentucky Fried Chicken had opened more than 2,500 outlets in China, adding about 250 new stores every year, and McDonald's had over 1,000 restaurants in China, opening about 150 new stores each year. In 2008, Chinese consumers purchased about 9.5 million vehicles and Rolls Royce sold over 100 of its luxury cars in China, equal to 10% of global sales. Fifteen years ago, imported wine consumption in China was almost zero, but now imports are growing at more than 30% per year. In 2007, French champagne sales in China reached 660,000 bottles, an increase of nine times over 2002 levels. In 2008, advertising revenue in China increased by more than 9% to \$27.8 billion, and it is clearly working.

2.4 Resource constraints

Humans already take up 83% of the Earth's land surface to live on, farm, mine or fish. Of the land suitable for farming rice, wheat and corn, 98% is already used, and much of that is being degraded from overexploitation. Humans have appropriated 40% of the planet's net primary productivity, 35% of the productivity of the oceanic shelf, and 60% of freshwater runoff. A quarter of the world's rivers run dry before reaching the ocean. Virtually all fish stocks are overexploited and the oceans have multiple, vast dead zones and acidification rates at least 100 times faster than any time over the past 20 million years. Human activities convert more nitrogen into

reactive forms than all forms of natural processes. The Millennium Ecosystem Assessment found that 60% of the planet's ecosystem services (such as climate regulation, provision of freshwater, waste treatment, and fisheries) were degraded or being used unsustainably. Of the nine main planetary biophysical boundaries, we have already transgressed three—biodiversity loss, climate change, and nitrogen cycles, possibly irreversibly. Combine these stark statistics with the realisation that humans are now so dominant a species on the planet that fossil fuel energy consumption, livestock production, rice cultivation, and loss of forest cover are causing potentially irreversible changes to the atmosphere and climate and it should be obvious that we have to change our consumption and production patterns.

3. Current responses

3.1 Stakeholder involvement

An effective policy mix with multiple stakeholders should take into account the variability of each stakeholder's potential to be a key actor in the lifecycle of a product and of their potential to act and have influence on the intended outcomes. Depending on the context and point in the lifecycle each stakeholder may have a greater or lesser potential to influence and to be influenced.

In the case of packaging for example, a growing and visible issue in the region, the end consumer, though influential, is not the most significant stakeholder to affect change despite their obvious position as the stakeholder making the decision to buy. Options and alternatives are often limited or not available, while essentially consumers consume products, not packaging. While the municipality has limited influence over business packaging decisions, it is the brand owner and the retailer who form the nexus of influence – with the brand owner in this context as the lead actor. A major message of the section on stakeholders, and the entire White Paper, is to not fall into the trap of making a scapegoat of the end consumer in sustainable consumption, but to carefully assess the entire lifecycle and to create a dynamic policy mix appropriate for the context that takes into consideration the potential for each stakeholder group to act.

To facilitate systemic integration of sustainable consumption three pre-conditions must be taken into consideration for policy design: the right attitude among actors, a facilitating system, and appropriate infrastructure. Voluntary and regulatory policy options to this end include choice editing, extended producer responsibility, and standardising packaging while leaving open options for individualised labelling for visual product differentiation. A unique analytic framework has been developed to support analysis for sustainable packaging. The Triple I framework discussed in chapter 2 is used in describing and understanding drivers of packaging use, what influences decisions in the value chain, how power is wielded by various actors, and individual and institutional opportunities to facilitate a general shift towards more sustainable packaging.

While in a specific context such as packaging the local government may not play a strong role in achieving the outcome of reduced packaging, local governments do however have a unique role to play in local initiatives by looking inwards at their community to facilitate, motivate, and mobilise other stakeholders. Looking beyond their local community, these local governments must also take on the task of accessing resources and plugging into regional and international dialogues either on their own or through cooperation with non-governmental organisations. This role of coordinating, cooperating, and communicating local initiatives has the benefit of amplifying project impacts and safeguarding the community from risks associated with innovative projects.

Taking a perspective on businesses as responsible stakeholders, regulatory and market-based environmental instruments on their own have been met with some success in Asia but have not been entirely effective for streamlining sustainable production—partly because these approaches are not oriented to a wide set of actors. What this indicates, and what our analysis finds, is that as a reputational incentive Corporate Environmental Information Disclosure (CEID) could be a major contributing factor to an effective policy mix. By using selected examples from the Asia-Pacific region, the cases of CEID initiatives in this White Paper support this idea by showing clear signs of effectiveness in reducing pollutant emissions while improving companies' environmental management performance. The CEID approach, be it mandatory or voluntary, has an advantageous feature of acting as a communication platform between the companies and their related stakeholders, thus allowing such stakeholders as investors and consumers to make better informed investment and consumption decisions.

For this strategy to work more effectively in developing Asia, efforts should be channelled so that they address specific aspects, such as the provision of accurate information for stakeholders, empowering the stakeholders to generate sufficient pressures and incentives, and coupling CEID with regular enforcements and possibly other incentives options.

Information provision as a policy option is about more than one stakeholder group providing data to another as through labelling or information disclosure. Educating consumers, in all the realms in which they consume, must be based on capacity development and a supportive social and institutional infrastructure in order for consumers to be active participants in sustainable consumption.

3.2 Natural resource sectors

Changing consumption behaviour through action such as laws and regulations, education and communication campaigns is at the heart of reducing pressure on constrained resources. Among these policy tools, economic instruments can be a very effective tool, particularly in the context of sustainable water use. In such cases water charges can make water users recognise the economic value of water and motivate them to use water in a sustainable manner. Economic instruments are also recognised as a useful tool for cost recovery of water services, which in turn can make water services more sustainable. Case studies in Southeast Asia demonstrate the contexts in which these policy tools can be much more efficient than regulations and give more flexibility to users to adapt. However, there are various barriers in the implementation of economic instruments such as users' unwillingness to pay and undefined water user rights. In addition, there is concern that the introduction of economic instruments may increase the cost of water thereby creating a barrier to water access for the poor. The nature of the resource used and contextual factors such as water abundance and economic development, as shown in the contrasting cases of water use in Cambodia, Thailand, and Singapore determines the varying degree of emphasis on certain policy types and the finesse involved in applying economic instruments.

The forest products sector has been grappling with these issues for several decades, most recently taking as a basic assumption that their strategies need to bridge sustainable consumption and production by combining measures in both consumer and producer countries. Merely increasing demand for sustainable forest products through labelling and other information provision measures does not mean that suppliers can provide such products, and this is a particularly difficult problem to overcome in tropical countries where forest management practices are often well below sustainability requirements.

Whether it is a wooden table, a house constructed with wooden framing, a ream of paper, or a bar of soap made with palm oil, consumer decisions send signals to forest and land managers that impact the health of forest ecosystems. When consumer choices for products containing wood materials are not informed by sustainability concerns, the signal to forest managers, traders, manufacturers, house builders, retailers and others who use and handle wood materials is that they can continue with their current practices, no matter how environmentally destructive some of these might be.

There is increasing recognition that actions in tropical developing countries to improve forest management need to be supported by actions in countries that import and consume tropical forest products. It is tempting to draw quick conclusions about what types of policy are needed, but their implementation may not be so straight forward, and in some cases, could lead to perverse outcomes. For example, applying the concept of the 3Rs (reduce, reuse and recycle) to wood consumption seems to make sense, but if done uncritically could result in increased consumption of wood substitutes that have heavier environmental footprints.

Ultimately there is a need for a range of innovative approaches and a well coordinated set of actions—voluntary sustainability certification schemes, procurement policies, capacity development and good governance, consumer awareness campaigns, and legislation banning the import of illegal timber or requiring checks on legality by importers. To achieve sustainable consumption, production systems must not focus solely on the concept of sustainable timber yields, but reflect the broader array of principles to achieve sustainable production. Some of these initiatives are very new and their full impacts on forest management and the production of wood products are as yet unclear; while others have proven their effectiveness over time. Nevertheless, the risk remains that action by only some countries to curb the import of illegal timber, and the inherent limitation of forest certification as a voluntary instrument, could merely lead to a shift in the consumption of unsustainable timber from one individual, company or country, to another.

As with forest sector products, sustainable production and consumption in agriculture and food security are linked through a web of feedback connections. Significant increases in production have been achieved in staple food crops such as wheat, maize, rice, and potato—which serve as the principle food source for billions of people worldwide. However, food security gains have not come without a cost due to how we achieved these gains in food production over the past few decades. Intensification of agricultural production with modern inputs and excessive use of chemical fertilisers and pesticides have caused agricultural productivity to stagnate and even decline in some regions, while inflicting serious environmental damage such as soil degradation, resource depletion and biodiversity loss. Agricultural intensification has also given rise to serious food safety concerns: pesticide contamination of water and food, genetically modified organisms, toxic residues found in food, and antibiotic resistance due to excessive use in animal production industries. In addition, poorly managed post-harvest food supply chains have only added to the food safety issues through contamination and food spoilage.

Responses to these challenges come in a two-pronged approach: harmonisation of standards to promote organic agriculture; and a diverse policy mix aimed at multiple stakeholders throughout the value chain of food products. This policy mix includes a lifecycle approach to food safety involving coordination among producers and government agencies. As the food industry matures in developing countries, a seamless food safety system consisting of both regulatory and non-regulatory measures would be effective to narrow the risk of breach and close the loopholes for illegal activities.

Economic incentives or disincentives given to food producers to promote food safety measures include targeted farm subsidies, prevention of negative externalities, price incentives for safe food with a robust monitoring and evaluation system that keeps track of performance of different food producers, and a high Value Added Tax (VAT) on food products with high environmental impacts. If the nexus of interaction between sellers and buyers is the point of purchase, additional policy options can aim in each direction—capacity building for producers to support innovative development and leapfrogging; and awareness generation among consumers who can in turn “vote with their fork” every time they shop. Capacity building measures have been successful in Japan through public-private partnerships, while micro-financing and loan programmes are additional viable options for support.

One of the driving forces behind attention being paid to natural resources use is climate change, and the contribution to climate change by energy production and consumption. Essentially, we have developed to a point where it is clear that our energy use is not sustainable and in finding cleaner alternatives the transition to harnessing low carbon energy sources should be coupled with efficient use in addition to consuming less. Many recommendations for energy issues are top-down, as the shift from fossil fuels dependence to renewable energy use is often seen as a political problem. But the solutions require acceptance and cooperation from individuals as energy use, especially in urban areas, is driven by growing individual energy needs. Most of the discussions and solutions are addressed on a national scale forgetting that it is not the country itself but the citizens of that country who need and use the energy.

This transition to renewable energy should be driven by a price on carbon, with two viable options: a carbon tax or the cap and trade system. Putting a price on carbon, subsidy-switching from fossil fuel sources to renewables, and recognising the co-benefits of renewables could fast-track the development of renewable energy as electricity source, both in rural and urban areas, and the shift to cleaner, more efficient modes of transport. Complementary measures and policies on capacity building and training, research and development (R&D), and good governance should be put in place to sustain investments and projects. As with the recommendations for other sectors, a multi-pronged approach is needed to take advantage of international agreements and processes, as well as networks and relationships among individuals and organisations. Bottom-up approaches empowering the choices of communities and individuals preferring non-fossil fuel sources for electricity and transport uses should be supported to ensure the effectiveness of top-down government policies.

3.3 Cross-cutting themes

Spurred by high fuel prices, growing concerns over energy security, and climate change, national governments in Asia have implemented various measures to improve building designs and appliances. These include voluntary programmes, building and appliance standards and labels, educational programmes, best-practice and benchmarking programmes, state market transformation programmes, financing, and public sector procurement. Mandatory and voluntary standards and labels for appliances have already been instituted in 60 developed and developing countries. The Chinese government has implemented a “regulation on energy conservation in civil buildings” which sets a legal framework for building energy performance assessment.

Policies to reduce energy consumption in the transport sector can be divided into the following: (i) reducing unnecessary travel through land use planning, congestion charges and non-motorised transport; (ii) shifting or retaining mode share of mass transport; and

(iii) improving energy intensity through fuel switching or fuel efficiency standards. Much of Asia already has high-density and mixed-use environments that can reduce distances travelled and energy use. Currently Asian cities have average population densities of 150 people per hectare, whereas density figures in U.S. cities tend to be closer to 15 to 26 persons per hectare. In addition, many Asian countries have high levels of non-motorised transport (walking and cycling). As Asia urbanises, therefore, choices must be made to prioritise mass transit systems over cars and retain high densities rather than urban sprawl. Singapore provides a model, with more than 50% of households and 40% of places of work located near the mass transit system and vehicle ownership remaining at a comparatively low 100 cars per 1,000 people.

IGES modelling results show that low-carbon society measures that have been proposed by countries such as Japan may contribute to economic development with a drastic reduction of national CO₂ emissions, but they may have adverse environmental and economic effects on other countries. Regional cooperation, however, in the form of a regional cap and trade scheme and financial assistance from Japan to affected countries will achieve a significant carbon emissions reduction for ASEAN+3 countries (by 17.6% from the business-as-usual (BAU) emissions in 2020) with relatively insignificant real GDP losses. The final section of this White Paper emphasises that regional perspectives to promote SCP may be preferable to measures being applied only in one country, and demonstrates, based on quantitative case studies conducted by IGES, that SCP requires collective action and coordinated efforts through regional and international cooperation to address potential uncertain negative external influences and/or to facilitate effective implementation of domestic efforts.

4. Future options

4.1 Stakeholders, policy options, and context

Throughout the White Paper three themes continuously appear—multi-stakeholder engagement, a mix of policy options to address the complexity of consumption and production, and accounting for context—particularly when adapting policies from other areas. The following tables summarise these key messages from each of the chapters.

At the centre of the analysis of this White Paper are the roles of various stakeholders and the contexts in which they work. Each stakeholder group has their primary roles and responsibilities in SCP, with many roles to play and actions to take, highlighting the key message of this White Paper of the need for multistakeholder cooperation, coordination, and communication. This White Paper extensively details how it is difficult for any single stakeholder group to act alone, in particular end consumers, to effectively change the complex system of production and consumption, and provides recommendations and roles for stakeholders in light of their context. In addition, focusing on one stakeholder group to the exclusion of others will not result in the broader systemic changes in society that are essential for SCP to take root and grow. The following list details some of the primary roles and responsibilities for stakeholder groups covered by this White Paper and the contexts in which they are discussed.

Stakeholder roles and multi-stakeholder engagement

Stakeholder	Primary role and responsibilities	Chapters and topic
Local governments	Foster conditions for sustainable consumption and production practices in their communities to engage and coordinate with other stakeholder groups; implement if necessary or support implementation by other stakeholders.	Chapter 2 – Packaging: waste management Chapter 3 – Education: non-formal and informal Chapter 5 – Local initiatives: support of mayors and other local government agencies Chapter 6 – Community engagement
National governments	National legislation and regulation to redirect consumption to sustainable goods and services; leading through green procurement and choice editing.	Chapter 2 – Packaging Chapter 3 – Education Chapter 4 – Business and the environment Chapter 5 – Local initiatives Chapter 6 – Community engagement Chapter 7 – Water consumption Chapter 8 – Forests Chapter 9 – Renewable energy Chapter 10 – Agriculture Chapter 11 – Climate imperatives Chapter 12 – Transboundary issues
International organisations	Negotiate global agreements; transfer of technologies and harmonised standards.	Chapter 5 – Local initiatives Chapter 11 – Climate imperatives
Nongovernment organisations	Operate in areas governments may not have the will or capacity to work in, by utilising access to local networks and international know-how and resources.	Chapter 3 – Education Chapter 5 – Local initiatives Chapter 6 – Community engagement
Businesses and retailers	Environmental information disclosure; influence consumers to consume and use products sustainably, innovate ecologically sound practices throughout the value chain, and eliminate unsustainable products and practices.	Chapter 2 – Packaging: eco-labelling, embedded carbon Chapter 4 – Business and the environment: influence through global supply chains
End consumers	Access information and discriminate against ecologically unsound producer choices, thereby making informed, ecologically sound purchasing decisions; at the end of use, ensure proper disposal.	Chapter 2 – Packaging Chapter 3 – Education Chapter 4 – Business and the environment Chapter 5 – Local initiative Chapter 7 – Fresh water Chapter 9 – Sustainable energy Chapter 10 – Food safety Chapter 11 – Climate imperatives
Brand owners	Environmental and health information on labels.	Chapter 2 – Packaging: standardised containers suitable for recycling
Investors	Socially responsible investment that precludes investment in unsustainable production.	Chapter 4 – Business and the environment

Dynamic policy mix

This White Paper shows that despite the plurality of SCP each sector and context has potential for government policies and initiatives which place greater emphasis on either production or consumption. In addition, analysis across the broad contexts detailed in this White Paper has shown there are no silver bullets or simple one-shot policy solutions for SCP. Each chapter and the case studies within have outlined numerous policy types,

recommendations, and enabling factors which are dependent on their respective context. The following table summarises these policy types and shows examples of some of the options that could be undertaken. For this summary these policies are taken out of their original context, but a reference is given to chapters where fuller details of the context and situations where these options were or can be engaged are found.

Type of Policy	Examples	Source Chapter
Command and control	Food safety standards Choice editing Extended Producer Responsibility Building regulations Norms and standards Forest product trade regulation Mandatory corporate environmental information disclosure	Chapter 10 – Agriculture Chapter 2 – Packaging Chapter 2 – Packaging Chapter 11 – Climate imperatives Chapter 9 – Sustainable energy Chapter 8 – Forest Chapter 4 – Business
Market-based	Pollution charges Water pricing Economic incentives/disincentives	Chapter 7 – Water Chapter 7 – Water Chapter 11 – Climate imperatives
Voluntary	Voluntary corporate environmental information disclosure Voluntary forest certification	Chapter 4 – Business Chapter 8 – Forest
Information-based	Eco-labelling Carbon content labelling Nutritional labelling Social marketing Formal/informal/non-formal education Consumer education Communication and information sharing Capacity development Outreach – workshops, movies, posters	Chapter 1 – Introduction Chapter 3 – Education for sustainable consumption Chapter 4 – Business Chapter 5 – Local initiatives Chapter 6 – Community engagement Chapter 8 – Forests Chapter 10 – Agriculture

Context and enabling factors

While in other areas such as Europe, literature and policies for SCP are quite well developed and mainstream, SCP is still a developing concept in Asia and the Pacific. SCP knowledge in the region is rapidly taking shape through regional cooperation schemes such as the Asia-Pacific Roundtable on SCP, but there are many challenges remaining for mainstreaming and overcoming existing, and persistent, unsustainable policies. Having been built on years of focus on production processes, we are now seeing much greater, and much needed, emphasis on consumption and the institutions of provision which determine to a great extent how and what we consume. The rationale behind the above mentioned policy mixes and stakeholder roles is dependent on the context described in each chapter based on the conditions of the Asia-Pacific region and relies on enabling factors for successful creation and implementation. Enabling factors include supporting conditions and complementary measures such as complimentary policies, programmes aligned to the objectives and goals of a policy, tools and initiatives that contribute to achieving the aims of SCP and the recommendations and insights developed in this White Paper. This illustrates that the right mix of stakeholders and policies alone may not be sufficient to achieve SCP unless the appropriate enabling environment is also present or can be created.

Chapter	Context	Enabling Factors
2. Packaging	Minimising unsustainable packaging in the global value chain.	Policies must target the lead actors (brand owners and retail chains), who have the greatest influence over packaging choices, while empowering other stakeholders through multistakeholder processes.
3. Education for Sustainable Consumption	Consumer education and provision of information.	Consumers who are aware of their central role in SCP and are empowered to choose responsible, sustainable lifestyles through reflective self-transformation.
4. Business	Corporate environmental information disclosure.	Provision of accurate information for stakeholders; empower stakeholders to generate sufficient pressures/incentives; and combine disclosure with command and control and market-based policies.
5. Local Initiatives	Promoting local initiatives for sustainable consumption.	Proactive actions by coordinators and facilitators to consult with and engage local stakeholders; responsiveness to local issues and concerns; support by local government leaders; and gaining external support.
6. Community Engagement	Empowering communities to undertake sustainable consumption practices.	Analyse and build on the strengths of community characteristics; choose communities open to external influences; motivate and mobilise people; and use multi-stakeholder partnerships to amplify project impacts and safeguard communities from risks.
7. Water	Sustainable water consumption through economic instruments.	Establish clear water use rights through integrated water resources management; create user willingness to pay by providing good and trustworthy services, including accurate measurement of water use.
8. Forests	Realigning tropical forest product trade towards SCP through voluntary and regulatory actions in consumer economies.	Coordinate actions in consumer economies with support to tropical forest managers to improve forest management practices and the security of supply chains to increase supplies of verified legal and certified sustainable timber.
9. Sustainable Energy	Promoting renewable energy for electricity, heating and transport.	Putting a price on carbon, coordinated renewable energy share targets, subsidy-switching from fossil fuel sources to renewable energy, and recognising the co-benefits of renewable energy; capacity building and training, technology transfer, research and development, and good governance; empower the choices of individuals, industries, and communities preferring non-fossil fuel sources for electricity, heating and transport uses.
10. Agriculture	Promoting food security and food safety.	Harmonisation of food safety standards, policy coordination through a lifecycle assessment approach, producer and consumer capacity building and information provision, and better storage infrastructure.
11. Climate	Minimising the consumption of energy services in the building and transport sectors.	Subsidies and information campaigns to accelerate deployment and drive economies of scale for energy efficient technologies and practices in the buildings sector; investment in bus rapid transit, railways and district heating and cooling; and avoiding the lock-in of unsustainable development driven by carbon-intensive technologies.
12. Transboundary Issues	Promoting regional cooperation in SCP in the Asia-Pacific region.	Avoid policies with negative spillover on neighbouring countries; use existing platforms for regional cooperation; address environmental "hot spots" in the global value chain through bilateral, regional and international cooperation.

4.2 Future research

With stakeholders as a focal point, Section II of this White Paper emphasises the need for further research on effective incentives for participation, standards and labelling information to guide consumers and producers, regulatory and economic frameworks that enable or constrain consumer choice, and appropriate infrastructure for sustainable consumption. More effective corporate environmental information disclosure, as a multistakeholder approach that links companies, the governments, the community and the market, is another aspect that has to be examined through additional case studies. Additional research is also needed in the case of local governments and community-based initiatives on how successful pilot projects can be scaled up and replicated.

As the overall goal of education for sustainable consumption is to affect changes in consumer behaviour, in order to develop substantive conclusions on long-term effectiveness following implementation of specific policy measures, additional studies should be carried out on changes in consumer practices, i.e., their attitudes and actions. In addition, research should be done on the ways and means of influencing social and cultural patterns of behaviour and creating impacts for paradigm changes aiming for sustainable lifestyles and practices in the Asia-Pacific region.

To achieve sustainable consumption in the forest sector, forest management plans must reflect the broad array of principles required to achieve sustainable production over the long-term, such as secure and equitable tenure arrangements, and respect for the rights and needs of forest dwelling and forest fringe communities. Additional research is needed on how sustainable consumption policies in developed countries will affect these broader aspects of forest management and not just the legal source and sustainable logging issues.

In the water sector, issues surrounding privatisation of water and economic instruments such as water trading require additional research to ensure that market-based instruments do not end up as another way to disadvantage the poor. There is no question that effective water pricing can influence sustainable consumption of water, but subsidies to low income families or minimum water rights as a basic human need may be necessary to balance the equity issues that arise. The effect of water pricing on users that have no way to participate in the market, such as aquatic species, also needs additional research. In agriculture, continuing research is needed on the extent to which organic agriculture can feed the growing world population and the impacts of chemical agriculture on human health and ecosystems.

In the energy sector, lifecycle assessment studies are needed to ensure that consumer choices are guided by comprehensive information, for example, to investigate under what conditions rail transport is a more sustainable option than motor vehicles and which options would be most suitable for household consumers when choosing renewable energy sources for their homes, depending on their context and means. Such major investments are often postponed or avoided entirely due to lack of accurate, reliable information.

In the final section on cross-cutting and transboundary issues, it was found that additional research is needed on embodied carbon emissions, and similar issues such as virtual water, in the context of global trading. Identifying carbon-intensive “hot-spots” and then investing in abatement and technology advancement can achieve an effective reduction of greenhouse gas emissions and improve the overall environmental performance of a product. With a consumer-driven global economy dependent on fossil fuels for energy,

each consumption decision affects the amount of greenhouse gases released, but additional research is also needed on what else is emitted or discharged. A product choice that merely swaps the nature of emissions from greenhouse gases to toxic or hazardous chemicals would do little to advance the concept of sustainable consumption. Similarly, government policies and product choices that advance environmental protection in the domestic economy but shift pollution to producer countries need to be better understood, so that governments can take regional and global coordinated action.

5. Conclusions

The image of a “green consumer” typically draws a picture of an eco-conscious customer in a shop carefully considering a product label, a person who knows that an “eco-bag” is not the only way to live sustainably. There is a marked difference though, between “sustainable shopping” and sustainable consumption, with the latter taking a much larger, complex, and multifaceted shape. This White Paper addresses sustainable consumption from this angle, by looking at where we live, how we meet our food and energy needs, the relationships among stakeholders in the value chain and lifecycle of a product, and the types of projects that can be implemented at the local level, but with the potential for regional implications. The analysis and recommendations are given here in light of the complexity of the relationship between consumption and production, and fundamentally the multiple drivers of consumption—economic, social and psychological, such as price, guilt, and even the simple satisfaction at being able to afford something.

While we have referred to “Western style consumption patterns,” that is not to say that there are not any practices that can be learned from the West—leapfrogging and taking advantage of social and technological trends such as transportation and organic agriculture are important parts of the key messages of this White Paper that can be drawn from Western examples. The simple message is that most Western countries consume far beyond an even generous definition of “sufficient,” at levels that could not possibly support every person on Earth. This is what we must recommend to the Asia-Pacific region to avoid and to forge its own development path that is sustainable and even a model for other developed and developing populations to emulate. The key message is that as countries do develop that there are consumption and production choices that can be made, and the same lifestyle choices made in countries past do not have to be taken.

Focusing on the tendency of middle class consumers to over consume does not reduce the importance of poverty alleviation. It is not a question of not addressing poverty alleviation; the question is about how to make their lives better and what they will do when they succeed at escaping poor living conditions and poverty. The goal is to look at consumption trends now, to acknowledge the implications of the aspiration treadmill and unsustainable consumption, and set the future path the region will take. We have learned a lot about SCP in the last few decades, and these lessons are being put in place in some areas, but there is more to be done.

Sustainable consumption must be driven by the provision of information on products and lifestyles that can build on the models from, and even compete with, global advertising budgets of billions of dollars per year and improve the systems of provision that are currently in place, such as energy, water, food, transportation, and education. More aware consumers are already changing production behaviours in proactive companies and more can be expected in the future. This provision of information involves much more than transmitting data about a topic, such as eco-labelling or awareness raising—it

is meant to influence individual consumers into making lifestyle choices and creating systems that foster sustainable consumption.

These systems should be based on the following points:

- i. Reducing energy demand and the demand for environmentally unsound products;
- ii. Moving away from carbon-intensive fossil fuels and their associated GHG emissions in all consumption and production activities;
- iii. Continuing to meet the development needs of all groups in society, but especially those that are poor and/or vulnerable, without equating those needs to a Western style consumption pattern;
- iv. Ensuring energy and food security, by concentrating on locally available resources;
- v. Innovation and adoption of appropriate technology and policies that continuously lead toward a low-carbon society.

We know that rapid growth is threatening global sustainability and we cover many of these issues in this White Paper. But we must also emphasize that serious efforts have already begun by governments, NGOs, industry, and other stakeholders, and these activities are encouraging, but much more needs to be done. These systems we create in the Asia-Pacific region will determine our outcomes in a changing climate and resource constrained world.

Section I

Introduction

The introductory chapter in this section presents an overarching hypothesis that sustainable consumption can drive sustainable production and lead to structural changes in the Asian economy, which in turn will form a virtuous circle and encourage ever-increasing sustainable consumption. The chapter discusses some of the main driving forces behind the economy and society in Asia-Pacific and the megatrends in the region which are contributing to the decline of global environmental quality and the driving forces of unsustainable consumption. These “driving forces” include current consumption trends among middle-class consumers and the global economic shift towards Asia; the equating of “quality of life” with “more consumption”; and the effects of global competition in the face of climate change, among other critical topics.

A major message of this chapter is that as countries develop there are consumption and production choices that can be made, and the same lifestyle choices made by countries in the past do not have to be taken. In other words, the authors ask: will we see Asia emerge with a new, sustainable, low carbon growth path that can leapfrog over outmoded development pathways and lead the rest of the world?

To help find effective responses to support these challenges the authors introduce a group of “big questions” that this White Paper aims to help answer. The “big questions” are aimed at issues of continued growth and unsustainable consumption of natural resources; the prospect of decarbonising, dematerialising, and decoupling energy consumption, and consuming sustainably overall when faced with lifestyle aspirations influenced to a large extent on Western patterns of growth and consumption; and what can be expected of Asian governments in terms of aiming for an economic model of prosperity unaccompanied by unsustainable production, consumption, and growth given the enormous scale of poverty in the region.

The authors explore some of the current responses and future direction for SCP in the region such as the enabling conditions and necessary policy shifts, while key questions are raised for consideration by major stakeholder groups – policy makers, business leaders, educators, and consumers. Finally, a brief overview of the subsequent chapters is provided.

Chapter 1

We are What We Consume:
Sustainable consumption in a resource
constrained world

Chapter 1

We are What We Consume: Sustainable consumption in a resource constrained world

Peter King, Robert Kipp, and Hideyuki Mori

1. Introduction

An overarching hypothesis – Consumption and production are intertwined in many complex ways. In theory, sustainable consumption, by definition should lead to sustainable production, as someone concerned with sustainable consumption would not willingly consume an item that was produced unsustainably. Sustainable consumption is defined as “the use of services and related products which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life-cycle so as not to jeopardize the needs of future generations” (UNEP 2009a). Note the inclusion of services, quality of life, life cycles, and future generations—key themes to which we shall return throughout this White Paper. It should be remembered that the economy is made up of both goods and services and consumption of many services is not a drain on the world’s resources (e.g., a music recital, education, or public libraries). Moreover, consumption goods are not all equal in their environmental implications, and informed choices by consumers can make a difference in terms of production decisions.

Chapter Highlights

This chapter presents the overarching concepts of the White Paper, and explores major issues for SCP in the Asia-Pacific region. Key questions for major stakeholders are raised, followed by the focus of each of the subsequent chapters.

- This White Paper puts forward an overarching hypothesis that sustainable consumption can drive sustainable production and lead to structural changes in the Asian economy, which in turn will form a virtuous circle and encourage ever-increasing sustainable consumption.
- Human populations cannot continue to expand indefinitely expecting to live at *per capita* levels of consumption and production practiced by developed populations.
- As countries develop there are consumption and production choices that can be made, and the same lifestyle choices made by countries in the past do not have to be taken.
- Focusing on the tendency of middle class consumers to over consume does not reduce the importance of poverty alleviation. It is not a question of not addressing those in poverty, it is about how they consume as they succeed.
- The policy challenge for all governments in the Asia-Pacific region is to create the enabling conditions for sustainable consumption and production.

Also, in theory, sustainable production, sometimes referred to as cleaner production, should lead ultimately to structural changes in the economy, now characterised in a climate-constrained world as a low carbon society (MOEJ 2007) or the Global Green New Deal (UNEP 2008). Sustainable production is defined as “the creation of goods and services using processes and systems that are non-polluting, conserve energy

and natural resources, are economically efficient, are safe and healthy for workers, communities, and consumers, and are socially and creatively rewarding for all working people” (Lowell Center for Sustainable Production 2009).

In turn, this virtuous circle should then provide additional impetus for sustainable consumption as “green” goods and services become more widely available and price competitive (Figure 1.1). Combining sustainable consumption and production (SCP) conveys a holistic approach to minimising environmental impacts and maximising social benefits related to production and consumption systems (Harada 2006).

Figure 1.1 Opportunities for general consumers to purchase eco-friendly goods



Source: Harada (2006)

This White Paper puts forward an overarching hypothesis that sustainable consumption can drive sustainable production and lead to structural changes in the Asian economy, which in turn will form a virtuous circle and encourage ever-increasing sustainable consumption. The second part of the White Paper examines the roles of the key stakeholders—consumers, communities, local governments and businesses, as well as the policy role of national governments in creating appropriate incentives for change in this direction. The third part of the White Paper examines SCP in four key sectors—agriculture, forestry, water resources, and energy. The fourth part of the White Paper examines SCP in the context of cross-cutting themes of climate change and regional integration. The final chapter then attempts to pull together these diverse strands and a coherent set of policy options that will assist Asia to accelerate the urgent need to move towards SCP.

The White Paper aims to help answer the following “big” questions: (i) can Asian economies continue to grow at 6-10% per annum without increasing its already unsustainable consumption of energy and raw materials; (ii) can Asia decarbonise, dematerialise, and decouple energy consumption, and consume sustainably in the face of widespread Western-style lifestyle aspirations; and (iii) can Asian governments be expected to strive for an economic model of prosperity without unsustainable growth, any time soon, given the overwhelming emphasis on tackling the region’s enormous incidence of poverty?

This introductory chapter starts with the main driving forces behind the economy and society in Asia-Pacific and illustrates the importance of economic growth and the consumption patterns that underpin such growth in the region for the future of the planet. Behind the continuing decline in global environmental quality are key megatrends such as (i) urbanisation and the growth of megacities in Asia; (ii) globalised production systems and “footloose” factories; (iii) the emergence of the middle class in Asia (despite massive, intransigent poverty in the region), along with aspirations for a “western” lifestyle of conspicuous consumption; (iv) the push by global brands to open new consumer markets in the rapidly growing Asian countries; and (v) the dawning realisation of global climate change and its implications for society, the environment, and the global economy. These megatrends threaten the planet with catastrophic outcomes unless their impacts are reversed. The chapter then examines current responses in Asia and responses in other countries that may be adapted to Asian conditions, and concludes that additional policy shifts, tailored to each country’s circumstances, are needed to accelerate the transition to SCP. The chapter concludes with a brief foray into the topics covered by the remainder of the White Paper, to provide a guide to the time-constrained reader.

2. Driving forces underpinning unsustainable consumption in Asia

Planet Earth is already being consumed at an unsustainable rate – It is a truism, but one that needs to be constantly reiterated, that human populations cannot continue to expand indefinitely expecting to live at *per capita* levels of consumption and production practiced by developed countries. Humans already take up 83% of the Earth’s land surface to live on, farm, mine or fish (Wildlife Conservation Society). Of the land suitable for farming rice, wheat and corn, 98% is already used, and much of that is being degraded from overexploitation. Humans have appropriated 40% of the planet’s net primary productivity, 35% of the productivity of the oceanic shelf, and 60% of freshwater runoff (Sanderson et al. 2002). A quarter of the world’s rivers run dry before reaching the ocean. Virtually all fish stocks are overexploited and the oceans have multiple, vast dead zones and acidification rates at least 100 times faster than any time over the past 20 million years. Human activities convert more nitrogen into reactive forms than all forms of natural processes. The Millennium Ecosystem Assessment found that 60% of the planet’s ecosystem services (such as climate regulation, provision of freshwater, waste treatment, and fisheries) were degraded or being used unsustainably (WorldWatch Institute 2009).

Of the nine main planetary biophysical boundaries, we have already transgressed three—biodiversity loss, climate change, and nitrogen cycles, possibly irreversibly (Rockström et al. 2009). Combine these stark statistics with the realisation that humans are now so dominant a species on the planet that fossil fuel energy consumption, livestock production, rice cultivation, and loss of forest cover are causing potentially irreversible changes to the atmosphere and it should be obvious that we have to change our consumption and production patterns. Box 1.1 further details the status of the continuing decline of our global environment.

Box 1.1 Global environmental quality continues to decline

“Although government and business leaders are beginning to respond more seriously to the global environmental situation, it continues to get worse. Each day, the oceans absorb 30 million tons of CO₂, increasing their acidity. The number of dead zones—areas with too little oxygen to support life—has doubled every decade since the 1960s. The oceans are warming about 50% faster than the IPCC reported in 2007. The amount of ice flowing out of Greenland during the summer of 2008 was nearly three times more than that lost during the previous year. Arctic summer ice could be gone by 2030, as could many of the major Himalayan, European, and Andean glaciers. Over 36 million hectares of primary forest are lost every year. Human consumption is 30% larger than nature’s capacity to regenerate, and demand on the planet has more than doubled over the past 45 years. This growth continues as, for example, more cars are expected to be produced in China in 2009 than in the U.S. or Japan.”

Glenn, J.C., T.J. Gordon, and E. Florescu (2009) 2009 State of the Future
(<http://www.millennium-project.org/millennium/SOF2009-English.pdf>)

Global economic growth has shifted to Asia – The United Kingdom’s Commission on Sustainable Development says that prosperity is possible without growth (Jackson 2009) and France’s President’s Commission on the Measurement of Economic Performance and Social Progress has drawn renewed attention to the failure of GDP to reflect sustainable development (Stiglitz et al. 2009). Progress in zero- or low-growth thinking is suggested while policies which increase social well-being, protect the environment, and place minimal burdens on natural, social, and financial capital are being actively sought.

Such esoteric thoughts, however, are basically lost on Asia’s giants. Despite some progress being made in key areas such as renewable energy, China has recently replaced Germany¹ as the world’s third largest economy and its breakneck development pace is placing enormous global pressures on natural resources, environmental sinks, and fossil fuels (with accompanying greenhouse gas (GHG) emissions responsible for climate change). India is fast catching up, with these two countries alone accounting for more than one third of the global population. Justification for maintaining such rapid growth is the priority given to poverty alleviation, although approaching poverty through a trickle-down approach based on continual economic growth is questioned by many observers (Todaro 1997; ADB 2009). Current orthodoxy in the economic literature is that growth is necessary but not sufficient for poverty alleviation, and “shared growth” needs to be more broad-based and inclusive to reach all segments of society (ADB 2009).

Will we see Asia emerge with a new, sustainable, low carbon growth path that can leapfrog over outmoded development pathways and lead the rest of the world?

The Asia-Pacific region is already home to more than 680 million middle-high income consumers, earning above \$7,000 per capita (UNEP 2005). Although only 26% of the region’s population achieve such incomes, if economic growth continues at the current rapid pace of over 5% per annum, the number of middle class consumers will grow exponentially. The 21st century has been described as the Asian century² but the real

question is what kind of consumption and production pattern will this century represent? Will it be the industrial revolution style model of the 18th and 19th centuries that led to the “grow now and clean up later” model of the 20th century which, in turn, led us into our present climate and resource conditions? Or will we see Asia emerge with a new, sustainable, low carbon growth path that can leapfrog over outmoded development pathways and lead the rest of the world?

Urbanisation is a critical driver – From 2000 to 2050, about 2.85 billion people will be added to the global population of approximately six billion, and of this more than 1.5 billion will be born in Asia (UNDESA 2004). This additional population surge coincides with a rapid urbanisation trend that will result in more than half of the Asian population living in urban areas. Unfortunately, modern, urbanised society is generally unaware of how their consumption patterns and preferences dictate how goods and services are produced. Far from their rural roots and ancestral connection with nature, urbanised consumers consume vast amounts of products completely divorced from any basic needs and often produced from chemicals that never existed in nature. As Asia is already well advanced along the path of urbanisation, succeeding generations will progressively lose the historic connection with the land and nature and will turn to highly processed and convenience foods, high “labour-saving” energy consumption, and vastly increased water consumption. New housing to accommodate the rural-urban transition will require new household appliances and spread out cities will require motorised transport to connect the population to schools, shops and employment.

These changes in consumption patterns, modelled on Europe and the U.S., will have far reaching consequences in developing countries of Asia-Pacific. Achieving a global shift towards sustainable development depends on the ability of the Asia-Pacific region to not only achieve an improved standard of living, partly through urbanisation, but to do so without going through the kinds of environmental degradation that developed countries incurred as they moved from agrarian societies to modern, industrialised societies.

Consumption has become equated to “quality of life” – Before humans settled into villages and towns, possessions were limited to what could be carried on a nomadic individual’s back. With sedentary lifestyles and increasing affluence, the number and/or price of possessions gradually became a measure of personal worth or status, especially as the old feudal hierarchies broke down and the pursuit of equality was equated with liberty. Over time, industry, supported by advertising, has pursued a constant message that essentially says “the more you consume, the more attractive you will become and the happier you will be,” with luxury equated to liberty. There is never any limit implied in the advertising campaigns—just buy more! In the past fifty years, the average consumption per person has nearly tripled. Globally, in 2008, consumers bought 68 million vehicles, 85 million refrigerators, 297 million computers, and 1.2 billion cell phones (WorldWatch Institute 2009).

Beyond the level of basic needs, consumers shop for a large variety of reasons including to seek comfort, to obtain or maintain status, to attract a mate, to be distracted from worries, or just to fill in time. They are less aware that increased consumption beyond a certain threshold level does not lead to increased quality of life, happiness or well-being. In fact, consumption is often so intertwined with seeking status that the latest acquisition by a neighbour or workmate can make one distinctly unhappy. Paradoxically, however, many people consume non-essential goods because they are unhappy, bored or depressed. Attempts to “keep up with the Joneses” typically results in a cycle of working more in order to consume more, with ever increasing work hours leading to a consumption treadmill where individuals constantly seek to consume and acquire “goods,” with happiness and quality of life remaining much the same or deteriorating due to declining health, less time spent on social activities, and more time on work related activities such as commuting and overtime.

Of course, there is no universal criterion of “quality of life” that can apply to all cultures and societies. Common features may include basic human needs (the Millennium Development Goals—food, shelter, clothing, clean water, etc.) plus companionship, community life,

cultural and religious practices and participation, health, rest and relaxation, recreation, personal development, reduced levels of stress, and high levels of job satisfaction. Individuals may argue for additional items such as beauty, but these vary from society to society. A universal truth, however, is that consumption of material goods and services are not sufficient for human well-being. In fact, over-consumption (e.g., of food, alcohol, or drugs) can have major negative health and social impacts such as obesity and diabetes, in addition to negative environmental impacts due to growing resource use and climate change impacts related to over-consumption (Edwards and Roberts 2009).

Since the mid-1900s income has considerably risen in the West while well-being, however it is measured, has not seen a relative change similar to that of income as a result of these increases (Easterlin 1974; Layard 2005). The results are what came to be known as the Easterlin Paradox which states that within a given population, higher income people are generally happier than lower income people, but richer countries are not necessarily happier than poorer countries, and over time, as income levels increase, happiness does not experience a concomitant increase (Easterlin 1974). Layard (2005) found that since the 1950s while income has greatly increased in the U.S., England, Japan, and most European countries, happiness has remained relatively unchanged, while unhappiness has not significantly decreased either. To be sure, additional income improves the lot of the poorest individuals and households, but after a certain level of sufficiency has been reached, further increases in income simply do not tend to have the same effect on quality of life and well-being as previous increases did. It is not simply a case of diminishing returns, although that is a factor, but unrealistic expectations about the value of consumption and quick adaptation to material acquisition.

People tend to overvalue the increase in well-being they think they will get following an increase in income and consumption, leaving them less satisfied than expected, which in turn perpetuates the cycle as they pursue ever higher material goals. Social comparison of relative income and consumption can lead to an unending and unsatisfying pursuit of material goods. The effect is a zero-sum game. When the income of everyone rises, thereby raising the consumption and short-term well-being of all, human nature is to adapt to these new levels of consumption and aspire to more, thus stimulating a pathway towards unsustainable consumption. Personal aspirations are additionally driven by comparison to others, resulting in a society where everyone is seen as a competitor and another's possessions are seen as an obstacle to one's own well-being. These conditions are not likely to result in happiness and satisfaction for all, regardless of the amount of output and consumption.

*The challenge is in convincing people that such pursuits may lead to greater well-being and satisfaction than the pursuit of income and conspicuous consumption, and in making these pursuits more **appealing, accessible, and affordable.***

The finding that income and well-being are not strongly related after a certain level is not without detractors, however, as other researchers such as Stevenson and Wolfers (2008) and Hagerty and Veenhoven (2003) find that increasing national income does increase national well-being though by a much smaller degree proportionate to the change in income. The policy recommendation, therefore, is not to abandon the pursuit of wealth and increased consumption altogether, but to

carefully consider the direction of development policies and to give greater consideration to how increased wealth will be spent—on more highways connecting suburbs to cities and on new cars; or on public spending on education and parks and personal spending on arts and services (Hagerty and Veenhoven 2003; Diener and Oishi 2000). These latter less visible forms of consumption involve time spent doing rather than accumulating. The

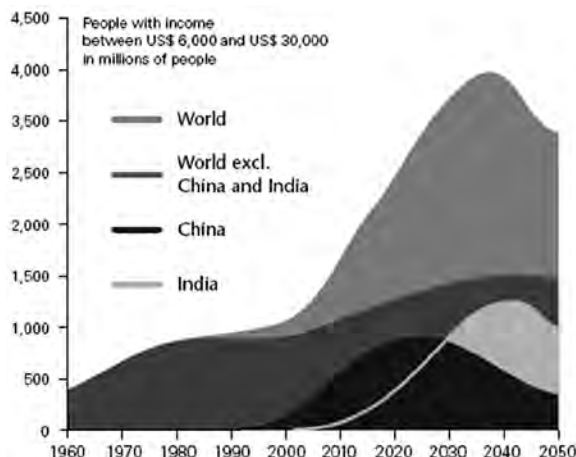
challenge is in convincing people that such pursuits may lead to greater well-being and satisfaction than the pursuit of income and conspicuous consumption, and in making these pursuits more appealing, accessible, and affordable.

Due to absolute limits of our environment and climate constraints, consumption patterns will have to be altered and in some cases reduced. Having experienced the sense of gain from a new possession as a result of higher income, an individual cannot easily revert back to previous levels of consumption—the sense of loss of something once owned can be much greater than the actual gain. Education and life experiences in arts and civil society, however, cannot be so easily diminished or taken away, and can be built upon by each individual personally with little environmental effect compared to, for example, moving into a larger house to accommodate increasing amounts of possessions or purchasing new cars for family members.

Changes in consumption patterns are notoriously difficult to engineer – Rising aspirations are not only subject to external influences and personal comparisons with others around us. The Diderot effect drives the “upward creep of desire” towards the acquisition of more and more consumer goods (Schor 1998). For a given set of consumer goods, household furniture for example, as new items are bought the remaining items appear less attractive in comparison to the new purchases, often compelling additional purchases based on this relative comparison between personal possessions. In addition, a major driver of expanding aspirations for material goods is advertising and the global reach of the individual, through mass media and the Internet. Rather than being compared to their peers in the local community or even at the national level, through multinational advertising and widespread access to the Internet, consumers are now being compared on a global level (Maniates 2002). These global level aspirations are critical for influencing the consumption patterns of the emerging middle class in Asia. As a result, local cultures change and conspicuous consumption increases as we see that life imitates advertisements far more than advertisements imitate life.

These are not new concerns, of course, but have worried many serious social observers in Western countries ever since Thorstein Veblen’s *Theory of the Leisure Class* in 1902 that recognised consumption for both utilitarian and status purposes. Vance Packard’s influential books, *The Hidden Persuaders* (on advertising) in 1957, *The Status Seekers* in 1959, and *The Waste Makers* (on planned obsolescence) in 1960, and *Our Endangered Children* (on future generations) in 1983, mirror many of the concerns still being addressed today. The global community at the 1992 Earth Summit in Rio de Janeiro and its follow up World Summit on Sustainable Development in 2002 in Johannesburg recognised that “fundamental changes in the way societies produce and consume are indispensable for achieving global sustainable development.” Fundamental change in any aspect of society, however, is always easier said than done, but it is even more problematic when developing countries of Asia believe it is now their turn to enjoy the fruits of economic growth over the past few decades in much the same form and substance as Western consumers have done for the past centuries.

Asian middle class consumers will determine global outcomes – It might be thought that unsustainable consumption concerns only apply to wealthy developed countries, where basic needs are no longer a primary concern. However, the emerging middle class in Asia was estimated at 226 million in 2004 (excluding Japan) and has already more than doubled (See Figure 1.2). This middle class bulge in developing Asia is expected to grow by a phenomenal 300%. It is no exaggeration to claim that the fate of planet Earth depends on how this middle class cohort in Asia, ultimately as large as 2 billion people, decides to consume—like Americans or sustainably?

Figure 1.2 The bulge in middle income consumers

Source: Goldman Sachs 2008

There is a danger, however, in wholeheartedly embracing the notion that changing consumption patterns or limiting income increases of this emerging middle class through policy interventions would lead to greater well-being or quality of life. Policy proposals along these lines in Asia are likely to be marginalised and romanticised as being idealistic but “fundamentally irrelevant” to practical policies, least of all sustainability (Maniates 2002).

That being said, policies which seek mainly to raise incomes, individual and national, to levels equal to that of developed countries are, on the one hand, incomplete in their excessive focus on GDP and income, and on the other hand, may be overreaching in their expectations of the level of well-being that could be attained simply by aiming for continuing economic growth. Finding a balance between economic growth and well-being must be a fundamental concern. There is no basic conflict between considering economic growth as important and at the same time an insufficient basis for human development (Anand and Sen 2000). The “maximisation of opulence” has no intrinsic value to improving quality of life, rather it is the instrumental role that income can play in supporting public policy and action in the social and environmental realms and on alleviating poverty, that is key (Anand and Sen 2000).

Better informed consumers are necessary but not sufficient – How well informed are Asian consumers about the environmental implications of their consumption and the power that they have over production decisions by making wiser consumption choices (including consuming less)? Are they more likely to fall prey to advertising and careful manipulation of lifestyle aspirations by companies looking to expand into a potentially huge new market? In 2008, advertising revenue in China increased by more than 9% to \$27.8 billion, and it is clearly working. As income and consumption increase, individual aspirations also change, creating the “sad tale of the aspiration treadmill” (Kahneman 2008). Mere provision of information on the environmental and social impacts of specific

What ultimately matters to... (achieving)...the goals of sustainable consumption is having the enabling policies and infrastructure for informed consumers to make the right choices and actions, as well as having a wide range of sustainable goods and services to choose from.

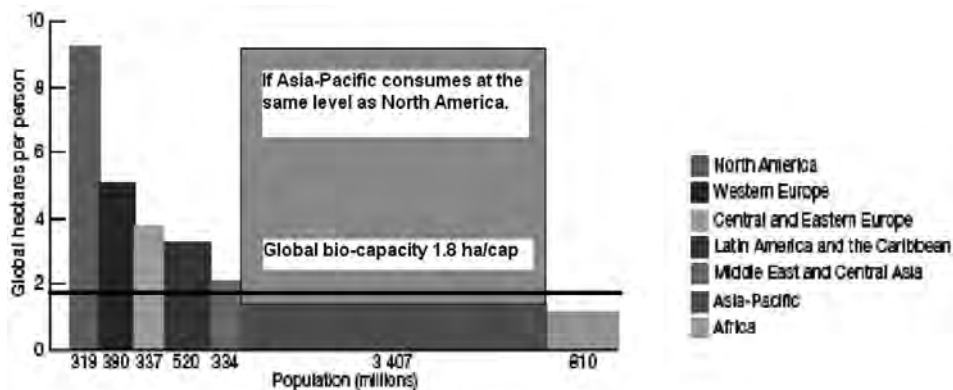
products may just result in shifting brand loyalty (Lee et al. 2009). Clever retailers like Tesco and Walmart are trying to maximise provision of better environmental information, while encouraging increased time in-store and increased consumption (Goleman 2009). What ultimately matters to these global supermarket chains is not which products are bought but increased market share and ever-increasing consumption. What ultimately matters to successful materialisation of the goals of sustainable consumption is having the enabling policy and infrastructure for informed consumers to make the right choices and actions, as well as having a wide range of sustainable goods and services to choose from.

Global companies are finding new consumers in Asia – By the end of 2008, Kentucky Fried Chicken had opened more than 2,500 outlets in China, adding about 250 new stores every year. McDonald's had over 1,000 restaurants in China, opening about 150 new stores each year. In 2008, Chinese consumers purchased about 9.5 million vehicles and Rolls Royce sold over 100 of its luxury cars, equal to 10% of global sales. Fifteen years ago, wine consumption in China was almost zero, but now imports are growing at more than 30% per year. Per capita wine consumption in China is only 6% of the global average, but the big suppliers (like Constellation Brands, which has annual wine sales of \$3 billion per year) recognise this market as the next big boom. In 2007, French champagne sales in China reached 660,000 bottles, an increase of nine times over 2002 levels. And India is soon to follow China down this path. The new Nano car developed by Tata Industries in India plans on initially selling 250,000 vehicles per year, while the average traffic speed in New Delhi due to road congestion has dropped to 7 km/hr, barely above walking pace. The Society of Indian Automobile Manufacturers reported that passenger vehicle sales in June 2009 rose by more than 8% over the previous year, compared to a downturn in commercial vehicle sales.

Climate change adds a new urgency – The links between unsustainable consumption and the planet's environmental woes are not new realisations, as they already underpinned the Club of Rome's *Limits to Growth*, Agenda 21 and the World Summit on Sustainable Development, but the urgency of climate change has fostered a renewed emphasis on finding a workable pathway towards SCP, now partially rebranded as a low-carbon economy or low-carbon society. The business as usual approach to consumption and production, according to the Intergovernmental Panel on Climate Change (IPCC) in its Fourth Assessment Report scenarios, will lead to average temperature increases of 4-5°C by the end of the century, with almost unimaginable consequences of sea level rise, extreme weather events, loss of coral reefs, and ocean acidification. Business as usual will lead to climate change that will not stabilise in the foreseeable future, possibly changing the capacity of the planet to support human life. To head off such outcomes, radical changes in economic structures are being proposed, broadly under the conceptual framework of a low carbon society.

Adopting Western consumption lifestyles cannot be sustained – If the emerging middle class in Asia decides to consume like the average American, then we will need four to five additional planets (Figure 1.3). Even consuming at the highly energy efficient level of the average Japanese, would be unsustainable. Even if only China grew and all other Asian developing countries remained poor, current consumption patterns would be unsustainable.

Figure 1.3 Ecological footprints



Source: <http://www.myfootprint.org>

As an example of adopting Western consumption lifestyles, consider car ownership. As one of the fastest growing sources of GHG emissions, cars are also an expression of success and rising income. In particular in China, India, and the Republic of Korea, these three countries have experienced annual car ownership growth rates of 12-20% largely attributable to per capita income growth among the middle-class (Meyers and Kent 2004), compared to GDP growth rates ranging from 2-9% for the period 1990-2003 (World Bank 2008). Compared to other developing regions in the world, car ownership as a factor of gross national income (GNI) is increasing the most in Asia. In some countries, a doubling of GNI leads to a more than doubling of car ownership. On top of the environmental costs due to emissions, manufacturing of the cars themselves, and the infrastructure for automobile use, there are also the social factors that are largely passed on to others such as accidents, congestion, and pollution in cities which lack urban planning to accommodate large scale ownership of vehicles (Willoughby 2000). While the scope of adopting Western consumption is a part of the problem, in Asia in particular the sheer scale due to population size is cause for thought (see Box 1.2).

Box 1.2 What if China consumes like the U.S.?

China's economy has grown at a rapid 9.5% per year since it began a broad-ranging overhaul in 1978. If the economy was now to grow at 8% per year, essentially doubling every nine years, the income per person in 2031 for China's projected population of 1.45 billion would rise from its current \$5,300 to \$38,000, or equal to the current U.S. per capita income, making China the world's largest economy. This would result in the following resource demands.

- **Food:** *If the Chinese consume resources in 2031 as voraciously as Americans do now, grain consumption per person there would climb from 291 kilograms today to the 935 kilograms needed to sustain a U.S.-style diet rich in meat, milk, and eggs. In 2031, China would consume 1,352 million tons of grain, equal to two-thirds of all the grain harvested in the world last year. To reach the U.S. 2004 meat intake of 276 pounds per person, China's total meat consumption would rise from the current 64 million tons to 181 million tons in 2031, or roughly four-fifths of current world meat production.*
- **Energy:** *If China were to burn coal at the current U.S. level of two tonnes per person, the country would use 2.8 billion tonnes per year—more than the current*

world production of 2.5 billion tonnes. And if the Chinese use oil at the same rate as Americans do today, by 2031 China would need 99 million barrels of oil a day. The world currently produces 79 million barrels per day and with peak oil on the horizon or already passed, may never produce much more than that.

- **Transport:** If car ownership in China were to reach the U.S. level of three cars for every four people, China would have 1.1 billion cars in 2031, compared to 795 million cars worldwide now. The paving of land for roads, highways, and parking lots would approach the area now used to grow rice in China. Competition between car owners and farmers for productive cropland would be intense.
- **Imports:** Surging Chinese demand has been a boost to countries as far away as Argentina, which bounced back from its 2001 crisis with an annual economic growth rate of 8%. Much of this is credited to Chinese demand for soy, which drove up Argentine production by 20% per year at a time when the South American country was struggling to do any international business. Argentina now provides one third of China's soy. A 1998 ban on logging old growth forests in China has driven massive deforestation in other Asian developing countries, as demand was never abated.

Source: <http://www.earth-policy.org>

3. Current responses to promote sustainable consumption

Global responses – An International Expert Meeting on the 10-Year Framework of Programmes for Sustainable Consumption (Marrakech, Morocco, 16-19 June 2003) noted that the real challenge now is to move from “the more generic to the specific and focus on implementation.” The Marrakech Process is a global process to support the elaboration of a 10-Year Framework of Programmes (10YFP) on SCP, as called for by the WSSD Johannesburg Plan of Action as the basis for globally coordinated activities. It is expected that the UN Commission on Sustainable Development will approve this slowly emerging 10YFP in 2010-2011 for implementation starting in 2012. Regional consultations were held in Indonesia and South Korea in 2003 and in the Philippines in 2008, with a view to developing a regional strategy for SCP.

A Global Green New Deal – In view of massive stimulus packages being proposed to deal with the 2008-2009 economic crisis, the United Nations Environment Programme (UNEP) called for a significant proportion of the estimated \$3.1 trillion to be invested in (i) energy efficiency in buildings; (ii) renewable energy; (iii) sustainable transport; (iv) protection of the global ecological infrastructure; and (v) sustainable agriculture. In reality, massive amounts went into saving stressed banks, automobile companies and consumer spending (such as subsidised car and appliance replacements) to get the economy back onto its long term growth trend (UNEP 2009). China and the Republic of Korea were among the top countries directing their stimulus packages into green business and sustainable infrastructure, but no country seized this opportunity for fundamental reform (HSBC 2009, Jackson 2009). Chinese experts estimate that for every \$100 billion investment in “green growth,” household consumption would increase by \$60 billion. Recent responses to the global financial crisis also suggest that Asia’s leaders are not helping the search for sustainable, low carbon economies by proposing that current export-led growth strategies, which have contributed to the global financial crisis, should be replaced by increased domestic consumption. These spillover effects illustrate that green growth in Asia is still growth, regardless of its colour, albeit with reduced impacts on the global environment compared to business as usual.

Current responses in Asia – Since 1997, the Asia Pacific Roundtable on Sustainable Consumption and Production (APRSCP) has been the main venue for discussions in the Asia-Pacific region on this topic, with seven roundtables held in various countries.³ A Regional Helpdesk on Sustainable Consumption and Production in Asia and the Pacific was jointly established by UNEP and UNESCAP in May 2006 to offer advice on SCP policies.⁴

In the early days of the APRSCP, the main focus was on cleaner production (its original name was Asia Pacific Roundtable for Cleaner Production), stemming from earlier concerns over environmental pollution, especially from small and medium enterprises in Asian developing countries. A series of cleaner production pilot projects was undertaken, mainly supported by the United States Agency for International Development (USAID). It was soon realised, however, that there can be no sustainable production without accompanying sustainable consumption, leading to a broadening of the concept at the roundtable, and bringing in new actors.

From 2005-2007, the European Union supported a project on Capacity Building for Implementation of UN Guidelines on Consumer Protection in Asia, which resulted in a guidance manual on Advancing Sustainable Consumption in Asia (UNEP 2007).

More recently, UNESCAP has rebranded the SCP concept as Green Growth.⁵ At the 8th APRSCP roundtable, held in Cebu in 2008, it was recommended that the Green Growth approach with its five tracks on green tax and budget reform, sustainable infrastructure, sustainable consumption, green business and ecological efficiency indicators could be strengthened to become the regional framework of programmes for SCP in the Asia-Pacific region. To date, SCP in the Asia-Pacific region remains a fluid concept without a firm consensus on its form or direction, with much more attention paid to technological solutions than to social and political innovation to address unsustainable consumption patterns and expectations.

Within the region, some countries are taking up the task of pursuing SCP with locally generated strategies which share concepts and goals of the broader SCP agenda. Possibly the latest (and hopefully final) twist on the terminology issue has been the recent interest in pathways towards a low-carbon economy or low-carbon society (LCS). The Japan-UK Low Carbon Society project (Skea and Nishioka 2008) offers the following definition of a LCS, as one which should:

- (i) take actions that are compatible with the principles of sustainable development, ensuring that the development needs of all groups within society are met;
- (ii) make an equitable contribution towards the global effort to stabilise the atmospheric concentration of CO₂ and other GHGs at a level that will avoid dangerous climate change, through deep cuts in global emissions;
- (iii) demonstrate a high level of energy efficiency and use low-carbon energy sources and production technologies; and
- (iv) adopt patterns of consumption and behaviour that are consistent with low levels of GHG emissions.

The Ministry of Environment, Japan identified three principles that define a LCS: (i) carbon minimisation in all sectors; (ii) a simpler lifestyle that realises a richer quality of life; and (iii) coexistence with nature (MOEJ 2007). Hence, it can be seen that a LCS is virtually synonymous with the basic concepts of SCP, albeit with the climate change and energy twist.

From these different approaches to SCP in Asia-Pacific there are some common elements that should be included in a consensus definition, comprising an optimal mix of:

- i. reducing energy demand and the demand for environmentally unsound products;
- ii. moving away from carbon-intensive fossil fuels and their associated GHG emissions in all consumption and production activities;
- iii. continuing to meet the development needs of all groups in society, but especially those that are poor and/or vulnerable, without equating those needs to a Western style consumption pattern;
- iv. ensuring energy and food security, by concentrating on locally available resources; and
- v. adopting appropriate technology and policies that continuously lead toward a LCS.

The emphasis on energy partly distinguishes a LCS from more general SCP paths, which would have to meet three conditions: (i) rates of use of renewable resources below rates of regeneration; (ii) rates of use of non-renewable resources below the rate at which sustainable renewable substitutes are developed; and (iii) rates of polluting emissions below the assimilative capacity of nature (Meadows et al. 2004). There are, however, sufficient points of commonality between a LCS and the prior concepts of SCP, that making a point of finding the differences would not be a fruitful or meaningful pursuit.

4. Future directions

Setting the enabling conditions – The concept of “natural capitalism” proposes four broad principles for achieving SCP: (i) increasing resource productivity (by at least a factor of 10); (ii) eliminating the concept of waste entirely, by redesigning an economy based on closing the loops of material flows; (iii) shifting from processing materials and making “stuff” to creating services and qualitative improvements in the standard of living; and (iv) rehabilitating the planet by investing in natural capital instead of financial capital divorced from the physical world (Hawken et al. 1999).

What is being done elsewhere in the world needs to be examined from four main perspectives:

(1) goal and target setting; (2) alternative pathways to reach these goals; (3) the use of models to test the feasibility of these pathways; and (4) the social and political responses to the various options that have been proposed.

Goal setting – As an example of goal setting, former Japanese Prime Minister, Yasuo Fukuda, in June 2008, stated his government’s vision comprising (i) transition from a fossil fuel dependent industrialised society; (ii) stepping forward with confidence, as an LCS will bring new business opportunities and is based on Japan’s traditional ability to live in harmony with nature; (iii) setting up a long-term goal to reduce CO₂ emissions by 60-80% by 2050; (iv) peaking out emission levels in the next 10-20 years; (v) developing innovative technology and diffusing existing technologies; (vi) setting up enabling institutions such as emissions trading and tax reform; (vii) implementing local government measures like producing and consuming locally; and (viii) behavioural change at all levels. While Prime Minister Fukuda’s political party was voted out of office mid-2009, the new Prime Minister, Yukio Hatoyama, has expressed his vision along the same lines as his predecessor, making even greater commitments to follow the scientific consensus on emissions reduction (Ministry of Foreign Affairs 2009). In addition, PM Hatoyama’s political philosophy is based on rethinking the fundamental structure of the world economy and adjusting the globalised version of capitalism, with more attention paid to local economies and greater regional integration.

Alternative pathways – To what extent is there a shared vision of the collective future of humanity, and what needs to be done to reach such a consensus? Scenario narratives are evocative of imagined futures and allow decision makers to understand the consequences of their policy choices. For the Global Environment Outlook (GEO-4), for example, four scenarios were defined: Markets First, Policy First, Security First, and Sustainability First. Selected indicators are used to illustrate the probable difference in outcomes of each scenario. For example, the range of atmospheric concentrations of CO₂ in 2050 is over 560 ppm in Markets First compared to 475 ppm in Sustainability First, while many observers are now arguing for a return to 350 ppm (from the current level of 387 ppm). Clearly, nations will find alternative pathways that suit their current circumstances, but is prosperity without growth and without ecological destruction really possible (Jackson 2009)?

Modelling – As one example of modelling approaches, the Japan-UK Low Carbon Society project undertook an international modelling exercise to compare a range of different models (macro-economic, technology-based and hybrid models) and scenarios towards 2050 in the UK, Japan, U.S., Canada, Thailand, and India. Core model runs were the base case, a carbon price case (where traded CO₂ would be worth \$100 per tonne by 2050), and a carbon-plus case, which assumed a 50% reduction in global CO₂ emissions by 2050. A common finding of the nine national teams involved was that LCS scenarios are technologically feasible but the social, economic, and political challenges are daunting, especially for developing countries.

Social and political responses – The varying negotiating positions of the more than 190 countries discussing the post-2012 climate change agreement to replace or extend the Kyoto Protocol, provide evidence of the differing social and political considerations that enter the mix of possible solutions to a common problem. Developed countries seeking to minimise the amount of compensation they need to pay, large developing countries not wanting to be bound by firm emissions targets, small island developing states and least developing countries wanting much more aggressive targets, illustrate the varying political and social considerations that each party brings to the negotiating table.

Policy shifts required to make the necessary transition to sustainable consumption and production – Given these common but differentiated positions, the optimal policy mix to make the necessary changes will vary from country to country but will involve some combination of the following policy approaches:

- i. Market-based: Taxation, cap and trade, subsidies, incentives, and feed-in tariffs;
- ii. Regulatory: Standards, mandates, legislation, and building codes;
- iii. Information-based: Certification, eco-labelling, product information, independent testing, education, and social marketing; and
- iv. Voluntary: Lifestyle changes, offsets, consumer boycotts, advocacy campaigns, and socially responsible investment. Some of the promising options are explored below.

The 6 re- philosophy – Essential elements of an effective policy approach for the future direction of SCP include (i) **re-thinking** the product and its functions (replacing goods with services); (ii) making products that are easy to **repair** and ensuring that skilled tradesmen are trained in repairs; (iii) **replacing** harmful substances in products with safer alternatives; (iv) designing products for disassembly so that parts can be easily **reused** or recycled; (v) **reducing** energy, material consumption and impacts throughout the product's life cycle; and (vi) **recycling**.

Redesigning products includes (i) development of new concepts, such as dematerialisation or miniaturisation; (ii) selection of environmentally friendly, recycled or recyclable materials; (iii) less consumption of materials and less transport; (iv) efficient distribution systems, including less packaging; (v) reduction of environmental impact associated with consumer use of the product; (vi) optimisation of product life, rather than planned obsolescence; and (vii) optimisation of end-of-life for recycling, reuse, and clean waste incineration.

Green procurement policies – Surveys in developed countries show that at least half of the consumers already claim that they buy environmental goods and would buy more if they knew more about their choices. But in the global recession, they reverted to price considerations or avoiding conspicuous consumption, showing that old habits die hard. Under these conditions, governments need to provide the lead by preferentially purchasing “green” products. Japan’s Law Concerning the Promotion of Eco-Friendly Goods and Services by the State and Other Entities came into effect in 2001. This law explicitly recognises that green procurement by the State will create incentives for

Aiming for a policy mix: Voluntary approaches by companies to green their supply chain may not be sufficient and governments may need to intervene, especially in influencing the behaviour of the thousands of many small and medium industries in Asia.

producers to manufacture green products thus creating more opportunities for consumers to purchase such goods. Hundreds of items (a total of 17 categories, including paper, stationery, office furniture, office automation, home electric appliances, air conditioners, water heaters, lighting, and vehicles) have been certified as being suitable for government procurement. Such green procurement (e.g., of hybrid cars, solar generation, high frequency inverter lighting, etc.) has also resulted in major reductions in GHG emissions.

Greening supply chains – A typical supply chain involves raw material extraction, transport to a processing plant, manufacturing, packaging, transport to a retail outlet, retailers, consumer purchase, transport to the household, household use, and disposal. Each of these steps involves energy use and emissions of GHGs, plus various other pollutants. Greening of the supply chain involves reducing the environmental impacts of every step, which stands in stark contrast to the normal concept of company responsibility within the factory walls. Voluntary approaches by companies to green their supply chain may not be sufficient, however, and governments may need to intervene, especially in influencing the behaviour of the many thousands of small and medium industries in Asia. Compliance assistance centres are being established in India, Philippines, Thailand and other countries to assist small and medium enterprises to comply with the relevant environmental laws.⁶

Root and branch changes to deal with climate change – Consider some of the political and social changes required to achieve a global adoption of SCP in a climate constrained world: (i) parallel tax reform and/or cap and trade GHG limits; (ii) technology transfer/spillover to developing countries; (iii) relaxing patents and intellectual property rights to low-carbon technologies; (iv) institutions facilitating technology transfer and technical assistance; (v) redirecting consumerism in emerging economies and reducing consumption in developed economies; (vi) changes in individual values, aspirations and lifestyle choices away from material consumption towards services; (vii) funding research and development on dematerialisation in production processes (such as nanotechnology); (viii) providing low-carbon choices in urban and transportation planning, building design, and material substitution and recycling; and (ix) linking poverty reduction and a low carbon development path. These are non-trivial changes, requiring many decades of effort, with significant transition costs of the enabling policies. Sustainable consumption is somewhere

in the mix of changes needed but clearly cannot be relied on as the sole source of the necessary root and branch change in social and economic structures.

Information-based policies – Examining the sustainable consumption policy options that have been debated so far and the challenges in achieving widespread adoption of policies that will make a significant difference in Asia, the most promising option appears to be policies that mandate provision of better information to consumers, so that they can make wiser consumption choices. Some observers believe that modern information technology and radical transparency will change the relationship between consumer and producer and better informed consumers will demand environmentally sound products and boycott companies that do not deliver (Goleman 2009). Social networking sites, SMS and Twitter, YouTube, etc., will allow information to spread virally, especially among the young. As a modern supermarket has over 15,000 product lines, generating useful information and conveying this information in simple terms is a major undertaking. Groups like GoodGuide rate over 70,000 products on health, environment and social grounds on a scale of 1 to 10, but how effective such ratings will be remains unknown.⁷ Eco-certification schemes for forest products and fisheries are having some impression on producers in these sectors, but there is still enough continuing illegal activity in both sectors to cast doubt on the effectiveness of eco-certification.

Making sustainable consumption “cool” – One of the primary factors in the rapid uptake of hybrid vehicles was the association with several celebrities who made very early purchases of hybrid vehicles as soon as they came onto the market. Nevertheless, the majority of “green” consumers are more or less committed environmentalists, who probably only amount to 10-15% of all consumers. To reach the uncommitted majority, sustainable consumption needs to be made much more fashionable. In relation to promoting low carbon alternatives, emphasis should be on saving money now, preventing a rebound effect (where money saved is spent on high carbon pursuits like holidays overseas), avoiding guilt and emotionally loaded words (like “environmental”), making the choices fun and desirable, and satirising high-carbon, high consumption behaviour (Pratt and Retallack 2009). When the average teenager laughs at someone driving a gas guzzling car, the message can be regarded as having reached its target. There are sparks of such moves among the young as expressed in consumer boycotts, brand avoidance, “buy nothing” days, the anti-globalisation movement, and various sub-cultures, but these still tend to be minority actions (Lee et al. 2009).

5. Questions to be addressed

Sustainable consumption concepts are beginning to influence some producers (and supply chains), who seek first mover advantage or have strong corporate social responsibility (CSR) motivations. Sustainable consumption in Asia, however, is constrained by a daunting lack of information on the impacts of consumption and availability of sustainable choices, the unmet aspirations for a “Western” lifestyle, and a “grow now, clean up later” attitude despite great efforts by some regional policy makers and practitioners. There is little evidence that SCP concepts are high priority public policy options leading to transformations in social and economic structures in Asia. The dominant paradigm of maintaining breakneck economic growth rates in Asia is incompatible with decoupling energy consumption, moving away from fossil fuels, and mitigating climate change, despite some positive moves in this direction.

Sustainable consumption must be driven by provision of information on products and lifestyles that can compete with and counteract the global advertising budget of billions

of dollars per year and improve the systems of provision that are currently in place, such as energy and water. More aware consumers are already changing production behaviour in proactive companies and more can be expected in the future. A major challenge, however, is influencing the behaviour of small and medium industries, which may only be possible through extended supply chains and sustainable procurement policies of large chain stores and major purchasers (including governments). The policy challenge for all governments in the Asia-Pacific region is to create the enabling conditions for more sustainable consumption and production (for example, through green procurement, taxes on high carbon products, support for green innovation, and removal of perverse subsidies) and then monitor and learn from any production changes in response.

Changes in consumption preferences by individual consumers alone will not drive structural change in the socio-economy—unsustainable production must be penalised, consumer choices must be widened, and governments must lead the way.

Some questions for policy makers – To what extent do current subsidies and other perverse incentives impede SCP? Do changes in domestic policy have transboundary consequences that may lead to unsustainable consumption and production in neighbouring countries? Does current government procurement foster SCP? How can governments provide additional incentives to change consumption behaviour? Does government policy ensure adequate choice for concerned consumers (e.g., services rather than goods)?

Some questions for business leaders – To what extent is consumer demand from Asia’s emerging middle class for better environmental information driving changes in production systems in Asia? As Asia is the “factory for the world,” how important are changing consumer attitudes in developed country markets in changing Asian producer practices? Are Asian producers anticipating the negative impacts of adverse consumer reactions and potential reputation risks and changing production practices before they are forced to? To what extent are Asian producers going beyond CSR and “greenwashing” and actually designing and producing innovative green products? Is mandatory environmental disclosure essential, or would voluntary approaches suffice? What is the optimal policy stance of governments from a business perspective? How important are shareholders, investors, and company staff in changing company environmental practices?

Some questions for educators – Is there an adequate curriculum for formal education on sustainable consumption in Asia? What kind of environmental information should be produced to meet the information needs of concerned consumers in different age groups? What can we learn from previous successful education campaigns in changing consumer behaviour? What is the government’s role in promoting education for sustainable consumption? How important is comprehensive environmental information as an input to education for sustainable consumption? Who is regarded as a competent and trusted provider of such information?

Some questions for consumers – Dominant cultural patterns that view increasing consumption as normal and natural are unsustainable. If (or when) this becomes the dominant cultural paradigm in Asia, the world’s ecosystems will collapse, probably irretrievably, and it is uncertain how many people the planet will be able to accommodate. Of course, we must all continue to consume to stay alive, and no one would deny the right of the world’s poor to achieve a basic level of comfort and well-being through increased consumption. Can consumers in the developing and developed worlds find a level and form of consumption that not only meets human needs but is also sustainable?

6. Overview of subsequent chapters

Chapter 2, which deals with the ever-increasing intrusion of packaging in our lives, finds that consumers need to have real choices if they are expected to change their consumption behaviour. Packaging has tremendous advantages in modern, urbanised societies that may impede or preclude the ability to purchase unpackaged (or sustainably packaged) products. Decisions on packaging are dominated by brand owners and producers, but other stakeholders like retail outlets, local governments (responsible for handling all the waste), and consumers can be engaged through dialogue in reaching multi-stakeholder agreements on minimising unsustainable and unnecessary packaging.

Chapter 3 on education for sustainable consumption also builds on the importance of information provision to direct self-transformation of consumer behaviour. Chapter 4 on corporate environmental information disclosure addresses an effective informational policy approach that either mandates or encourages disclosure of corporate environmental information. Both chapters point to the need for effective communication to change production and consumption behaviour.

Chapter 5 continues the examination of the role of stakeholder by focusing on local governments through a range of case studies, and finds that there are successful examples of local governments contributing to sustainable consumption and production, and peer-to-peer learning is an effective way for these good practice examples to be replicated. Chapter 6 continues the theme of local level actions bearing fruit, by characterising pioneering communities and their contribution to achieving sustainable consumption.

Turning to the resources sectors, chapter 7 examines the powerful application of economic policy measures in changing water consumption behaviour. Policy measures such as water charges, pollution charges, removing subsidies, and water trading are explained through the medium of successful case studies. In the forest sector, chapter 8 illustrates the widespread market flaws and governance failures that have made SCP of forest products so difficult to achieve. From evidence surrounding forest certification, public procurement policies, export licensing, legislation in consumer countries, and reduced emissions from deforestation and forest degradation (REDD), potentially more effective incentive and regulatory instruments are proposed. In relation to renewable energy, chapter 9 suggests that expanding consumer choice will help to boost the deployment of renewable energy in the Asia-Pacific region and also emphasises the crucial role of engaged consumers despite the tendency in this sector for top-down approaches. The final chapter in this section, chapter 10, observes that inadequate food safety in Asia is primarily due to policy failure and the strict standards and certification applied to organic agriculture could be one effective pathway to improved food safety.

In the first of two cross-cutting chapters, chapter 11 on sustainable consumption and climate change suggests that more sustainable lifestyle and consumption patterns could help to reduce energy use and GHG emissions. Chapter 12 makes the excellent point that one country's SCP measures should be judged against the impact that these measures have on sustainable development in neighbouring countries and trading partners. Banning unsustainable logging in one country, for example, without addressing the underlying demand for forest products, may simply shift illegal, unsustainable logging to other countries to meet the continuing demand.

The final chapter, chapter 13, brings together all of the possible policy options and instruments available to Asian countries from the previous chapters and observes that

much more research is needed before a comprehensive suite of effective policy remedies for sustainable consumption can be recommended.

Notes

1. China is on pace to replace Germany as the leader of producing renewable energy, in particular solar energy. The Chinese stimulus package in 2008-2009 included significant subsidies for photovoltaic installation. That said, the vast majority of solar energy capacity in China is exported.
2. Kishore Mahbubani. 2008. *The New Asian Hemisphere: The Irresistible Shift of Global Power to the East* (Public Affairs).
3. Under APRSCP, UNEP (2004) conducted a review titled *Sustainable Consumption and Production in Asia and the Pacific: A Review of Status and Trends*.
4. <http://www.scphelp.org>
5. <http://www.greengrowth.org>
6. Asian Environmental Compliance and Enforcement Network: <http://www.aecen.org>
7. <http://www.goodguide.com/about/ratings>

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Section II

Focus on Stakeholders

This section looks at the roles of major stakeholders in various contexts – sustainable packaging, education and information provision, business, local governance and project implementation.

Chapter 2 on sustainable packaging explores how an effective policy mix for multiple stakeholders takes into account the variations in power and potential for influence for the actors in a product's value chain, and pushes for allocating responsibility accordingly. The analysis finds that in the packaging value chain, the consumer, though influential, is not the most significant stakeholder. In addition, while the municipality is usually responsible for the costs of waste treatment, in reality it has limited influence over the type of packaging businesses use. Essentially it is the brand owner and the retailer that form the *nexus of influence* in sustainable packaging solutions. As such, policies based on a combination of *choice editing* and *extended producer responsibility* would edit out the most unsustainable packaging options and allocate responsibility for packaging waste management. In order to integrate sustainable consumption at a systems level, policy design needs to address three pre-conditions: the *right attitude* among actors, a *facilitating system*, and *appropriate infrastructure*.

Developing the right attitude among actors is based on education and information provision. But education is about more than transferring information from one person to another. As Chapter 3 discusses it is about stimulating consumer awareness of their central role in SCP and empowering them to choose responsible, sustainable lifestyles through reflective self-transformation. The authors discuss how education for sustainable consumption (ESC) pursues this concept with case studies from China, South Korea, and Japan based on an analytic framework which draws on diverse factors that can influence consumer behaviour – social and cultural patterns, political instruments, and personal behavioural change strategies. Policy implications are highlighted regarding the general structure and specific content of effective ESC policies with a “Five-Point Strategy” for ESC from planning to implementation.

Provision of information also finds its place in SCP through corporate environmental information disclosure (CEID). The CEID approach refers to providing information about the operational activities and environmental behaviour (products, production process, management procedures) of a company to consumers, investors, government officials, communities and the public at large. Chapter 4 on business and the environment explores how more informed and concerned stakeholders can make consumption decisions which may be translated into incentives for good environmental performers and pressure for the poor performing businesses to improve their production processes. Essentially, this is about empowering stakeholders to generate

sufficient pressures and incentives; and combining disclosure with command and control and market-based policies. As the author goes into detail it becomes clear that this is a challenging task as there are gaps between what companies are ready to provide, what stakeholders really need to know, and what they value in their consumption choices.

Chapter 5 on local initiatives may hold great appeal to policymakers and other leaders in society looking to facilitate stakeholder involvement and mobilise resources within and outside of local governments. This chapter looks at the challenges and successes of fourteen cases in Asia-Pacific encompassing sustainable energy, transport, food, and waste management. The analysis turns an eye on actions by coordinators and facilitators to consult and engage with local stakeholders in order to develop appropriate responses to local issues and concerns. With project implementation as the focus the analysis explores the interplay between finding support from local government leaders, gaining external support, and meeting the needs of those affected by the project.

These needs of the community are further explored in Chapter 6 on community engagement and SCP. In this chapter the author take a close look at various types of communities and the factors for successful implementation by emphasising one of the key messages of the overall White Paper – multi-stakeholder partnerships – which in this chapter are shown to be a tool to amplify project impacts and safeguards the community from risks associated with innovative projects.

Chapter 2

Is the Customer Really King?
Stakeholder analysis for sustainable
consumption and production using the
example of the packaging value chain

Chapter 2

Is the Customer Really King? Stakeholder analysis for sustainable consumption and production using the example of the packaging value chain

Lewis Akenji and Magnus Bengtsson

1. Introduction

An axiom that has shaped policy approaches to sustainable consumption and production (SCP) has been that if more consumers understand the environmental consequences of their consumption patterns, through their market choices they would inevitably put pressure on retailers and manufacturers to move towards sustainability. Using the example of packaging, this chapter shows that when a consumer goes to shop, he or she is looking for a product or service and not necessarily the packaging; the packaging is usually only incidental, an enabler for the product and a differentiator across categories. However, since a good amount of the packaging waste that goes to landfills and incinerators passes through the hands of consumers, it is too easily assumed that placing greater emphasis on changing consumer behaviour would drive changes in the market in the direction of sustainable production. By examining the relative influences of actors in the value chain, and the limited range of packaging options typically provided to consumers, it can be seen that the consumer mostly just channels packaging waste and is not the most salient or powerful stakeholder in this context. Thus expecting the end consumer, who has very limited influence over major players in the value chain, to be the primary driver of an issue as complex as sustainable

Chapter Highlights

With a view to designing effective SCP policies, this chapter looks at the roles and influences of various stakeholders in the value chain, using packaging as an example. Some key messages are:

- An effective policy mix towards multiple stakeholders should take into account the power variations among actors and allocate responsibility accordingly.
- In the packaging value chain, the consumer, though influential, is not the most significant stakeholder; also, the municipality, which usually carries the costs of waste treatment, has limited influence over business packaging decisions. The brand owner and the retailer form the *nexus of influence*; the brand owner is the *lead actor*—the most influential.
- Policies based on a combination of *choice editing* and *extended producer responsibility* would edit out the most unsustainable packaging options and allocate responsibility towards packaging waste management.
- *Packaging review panels* are proposed to review the national packaging situation, adapt or develop policy options, assist governments in implementation, and advise stakeholders towards sustainable patterns.
- *Harmonisation* of a) product packaging specifications across brands and b) packaging policies across the region is recommended to further reduce unnecessary packaging and waste.
- To integrate sustainable consumption at a systems level, policy design needs to address three pre-conditions: the *right attitude* among actors, a *facilitating system*, and *appropriate infrastructure*.

packaging is unrealistic—and a case of targeting the most visible stakeholder, rather than the most influential.

This study examines macro-level factors affecting packaging use in developing Asia. It describes and analyses major actors in the value chain, looking at their “interests, influences and instruments”—the *Triple I framework of stakeholder analysis*. The analysis highlights the lead actor—the one with the most influence in the value chain. In a multi-stakeholder situation like the packaging value chain, to be effective the right policy mix should direct emphasis at the nexus, targeting the most influential actor, thus allowing him to use his influence across the entire chain, causing cascading effects towards more sustainable packaging, but also recognising that all stakeholders in the value chain have a part to play.

Most research for this chapter was done for food packaging; analyses and recommendations however are not limited to that sector. Plastic is used as the case example, not necessarily because it is the most unsustainable packaging material, but because it shows trends and patterns in overall consumer packaging. Plastic is the most proliferating consumer packaging material for consumer products; it constitutes a substantial amount of household consumer waste, and has proven a burden for municipalities to handle. Plastic demonstrates many of the sustainability issues related to consumer packaging.

The most visible dimension, though hardly the limit, of the packaging problem is the resulting waste. Waste, especially plastic waste, has become an integral feature of our modern landscape—nestled together to form floating plastic islands on the ocean (Ryan et al. 2009), heaped into mountains at open dumping sites, or spewing out as fumes from chimneys of incinerators towering into the skyline (Economist 2009). Whether on land, sea or air, the seeming omnipresence of packaging waste has become indicative of the wastefulness of our consumer culture. Although it has been argued that we would not pay so much attention to the issue if waste was not so visible, the impacts of waste go beyond just being an eyesore. There are social and human health consequences (Talsness et al. 2009), dangers to marine life, resource depletion problems, and several more which science is continuously cataloguing as it investigates the impacts of our packaged lifestyles. Yet, as shown later, packaging also comes with many advantages, from increasing product protection to reducing food waste.

A society’s self-management of packaging is part of the bigger problem of self-management of consumption. It is the tip of the iceberg; how we deal with it and the resulting waste, a visible monument to consumerism, is indicative of how far we would go to address other aspects of unsustainable production and consumption.

1.1 The role of recycling—important but limited

Recycling of disposable packaging has increased in recent years and is commonly portrayed as the key to sustainable packaging systems. This chapter recognises the important role of recycling in strategies towards more sustainable packaging, but argues that priority should be given to avoidance, reduction, and modification of packaging design for improved sustainability. While this priority order is not valid in all cases, there are numerous studies validating the “waste management hierarchy” (OECD 2005) as a useful general rule-of-thumb. Recycling should not be regarded as the first or only solution, for several reasons, including:

- In practice, only a fraction of the total amount of packaging can be collected and recycled. Materials with low market value are particularly hard to collect effectively and will therefore end up in dumps or landfills, or be burnt in the open or in incinerators.
- The whole recycling chain, including collection, transportation and material processing consumes energy (often fossil fuels) and generates pollution.
- Post-consumer packaging is often contaminated, which means that it has to be cleaned in the recycling process—often with hot water. Cleaning adds significantly to the environmental impacts of recycling, mainly through water pollution and energy use for water heating.
- Certain types of packaging, especially composite packaging, are technically challenging to recycle.
- Recycling of plastic packaging requires that different kinds of plastics are separated, and this can be difficult to achieve when several types are used and households have little knowledge and low motivation to separate.
- The quality of recycled materials is in many cases inferior to that of virgin materials, either as a result of physical or chemical degradation of the material itself or due to contamination. This means that recycled materials can only be used for certain applications with low technical, hygienic and aesthetic demands. It also means that a constant input of virgin resources is needed for more demanding applications.

Taking the limitations and other drawbacks of recycling as one of its starting points, this chapter explores alternative strategies of addressing the packaging problem and suggests how these could be put into action in developing Asian countries.

2. Developing an analytical framework

Packaging is a complex issue involving several drivers and actors, sometimes competing with each other, as well as implications plagued with both scientific and practical uncertainties. A conceptual framework has been developed for this study to describe and analyse interactions among stakeholders along the packaging value chain, particularly highlighting variations in the amount of influence among actors. In developing the framework, several approaches representing different disciplines were studied, including models of analysing consumption drivers and behaviour, supply chain management, stakeholder engagement, and conceptual frameworks of instituting change. Following are some influential models:

- a) Needs-Opportunities-Abilities (NOA): The NOA model was developed by Gatersleben and Vlek (1998) for describing and understanding motivation for, and patterns of, consumption. It diagnoses consumer behaviour at the macro-level of society and the micro-level of the household. At the micro-level, “Needs” refers to individual objectives to attain, maintain or improve quality of life; “Opportunities” are external facilitating conditions for consumption (e.g., product availability and accessibility); and “Abilities” (such as financial and technical) are the set of internal capacities of the individual to procure desired products. The NOA model then subscribes consumption behaviour to macro-level drivers, because consumption takes place within a larger societal context affected by technology, economy, demography, institutions, and culture.
- b) Stakeholder theory: This theory asserts that companies have an obligation to meet the needs and expectations of diverse stakeholders, who are defined as groups or individuals who can influence, or are influenced by, a company’s operations

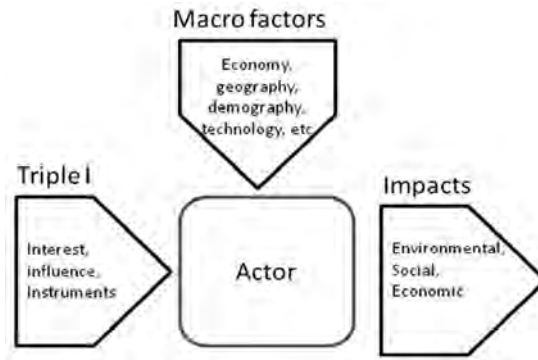
(Freeman 1984). A more sophisticated model has been proposed by Mitchell et al. (1997), who suggest that companies prioritise the needs and expectations of stakeholders based on their perceived power, legitimacy and urgency. The most salient stakeholders are those that possess all three characteristics.

- c) Global Value Chain (GVC):¹ The GVC framework studies global economic processes (such as the interrelated expansion of trade, foreign direct investment and transnational corporations) to understand why and how these processes are transmitted to the local level. It is especially relevant to the context of fast developing Asian countries where global players from industrialised countries are shaping the production and consumption patterns of these Asian economies. The GVC framework adopts the following logical flow of research steps:
- i. It identifies the stages and actors in the value chain from product conception to consumption. It further identifies the relative size, importance and roles of each actor in the value chain.
 - ii. It determines the geographic spread of the chain, taking into consideration how easily major companies are able to relocate their production facilities in order to gain access to raw material, new markets, and cheap labour.
 - iii. It analyses ties between actors in the value chain, examining governance structures that dictate how the chain operates and means through which power is wielded.
 - iv. It then looks at institutions that influence the activities of the value chain. These include governments, unions, trade associations, NGOs, multinational agencies and regulatory bodies.
- d) Awareness-Agency-Association: Ballard (2005) has combined a literature overview of “checklists for sustainable change agents” with his experience from field research and identified three key issues that need to be addressed if individuals and organisations are to respond to the challenge of sustainable development. They are awareness, agency, and association:
- i. Awareness of the issue, its scale, urgency and relevance; awareness of its complexity and of the limits of human agency;
 - ii. Agency refers to the role and skills to do something meaningful, and how actors can be influenced towards change. As Ballard argues, the most significant agency is usually found in addressing the wider contextual issues, for example by changing a law so that sustainability considerations may be more reliably incorporated at the design stage;
 - iii. Association with likeminded agents embarking together to achieve meaningful change. It can be empowering when similar actors are able to mobilise into a group with common objectives.

2.1 The Triple I Framework

In drawing from the above approaches, intersecting points were compiled, unique components in each model highlighted, and then these intersections and components were lined up against the objectives of this study. The result is a simplified model called the Triple I stakeholder analysis framework (see Figure 2.1). It is used in describing and understanding drivers of packaging use, what influences decisions in the value chain, how power is wielded by various actors, and individual and institutional opportunities to facilitate a general shift towards more sustainable packaging.

Figure 2.1 The Triple I model



Source: Authors

- i. **Interests** represent various stakes in the packaging issue, needs and drivers. This contributes an understanding of why packaging is used and why use is growing. It addresses the questions:
 - Who are the key actors involved in the design, manufacture, use and/or recovery of packaging?
 - What are their needs/expectations of packaging (functionality, costs, environmental performance, etc.)?
 - What are the drivers, patterns and trends of usage?
- ii. **Influence** refers to the role of each actor, influence over others, and the actor's position and relative importance in the value chain. This identifies who is most influential and can thus drive change in the value chain.
 - What is the role of each actor in the value chain?
 - To what extent can each of these actors influence the design, manufacture, use and/or recovery of packaging?
 - How much influence does each actor have in the value chain?
- iii. **Instruments** are mechanisms of operation of each actor—what actors use to wield influence, institutional frameworks under which they operate, and opportunities for sustainable change.
 - What instruments does each actor use to influence other actors in the value chain (government policies, procurement guidelines and specifications, etc.)? What other institutional aspects are likely to influence the design, manufacture, use and/or recovery of packaging (industry associations, industry awards, professional development, etc.)?

Given that packaging production and consumption takes place within a broader societal context, results of the Triple I analysis are placed within macro-level factors that affect packaging, such as technology, economy, demography, and culture.

This study examines macro-level factors affecting packaging use in developing Asia. It then describes and analyses major actors in the value chain using the Triple I model. Owing to space limitations, focus is on the four most influential stakeholders, and the analysis is done in reverse order to physical flows in the value chain: municipality > consumer > retailer > brand owner. The packaging producer is not analysed here as an independent stakeholder of major influence. As shall be shown, the bulk of packaging decisions, especially in the food processing industry, are done or influenced by

companies that either a) outsource their packaging production but maintain internal units (usually attached to the marketing department) that exert full control over the type of packaging specified to the contracted producer, or b) have their internal units that design and produce the packaging for their products.

The analysis shows the *nexus of influence* and highlights the *lead actor*—the one with the most influence. Core elements of a policy mix should employ the power of these stakeholders, in combination with other stakeholders, to drive the value chain towards sustainability.

2.2 Macro factors, drivers, trends

Several Asian countries have been experiencing and continue to experience rapid economic growth, with a subsequent rise in the use of packaging, in particular plastic packaging. This growth has been accompanied by a growing middle-class with more disposable income and with appetites similar to those observed in industrialised countries. Most of the resulting consumer class (Gardner et al. 2009) is concentrated in urban areas, which have experienced an influx of people from rural areas seeking better opportunities. The consumer culture has therefore become predominantly urban, with habits and lifestyles that demand more processed and packaged food. This is fostered by government policies promoting neoclassical economic growth, buttressed by the rush of industry to tap into new markets. The plastics industry identifies developing Asia as the region with the highest growth potential (PlasticsEurope 2009). Valued at approximately \$121 billion in 2004, the Asian packaging market is forecast to reach \$174 billion in 2011 (PIRA 2006). Over the last decade, the packaging industry in Asia has become increasingly sophisticated, and in most countries in the region, growth of the packaging sector is ahead of the nation's GDP growth; in the early 2000s, growth in the Chinese plastic packaging market exceeded GDP growth by 3% annually (Hoggard 2004), and in India the use of plastic packaging is expected to increase by 20% per annum over the coming years (PIRA 2007).

3. Triple I analysis for the packaging value chain

There are four main stakeholders in our analysis of the packaging value chain: municipalities/local government authorities, consumers, retailers, and brand owners. In the following sections the Triple I analysis is applied, showing the major interests, influences, and instruments for each.

3.1 Municipalities/local government authorities

The municipality, although technically a major stakeholder, is actually not a part of the industry value chain; it only enters after the production and consumption process. With landfills reaching capacity, waste cast aside on roadsides, and waste dumps emitting foul smells and smoke into residential and commercial areas, the problem of packaging waste is becoming more and more visible, increasing pressure on local authorities to take action.

However, local authorities, responsible for waste management in most countries, are usually short of staff and funds, and lack the technical know-how and infrastructure to set up and maintain appropriate waste management systems. Municipalities in Asia can sometimes spend over 50% of their revenue on waste management (Boyd 2002), with packaging waste constituting as much as a third of the waste in some cases. Municipal collection and recycling programmes must compete with other services for funding (CWMI 1999), forcing authorities to reallocate funds which would otherwise go towards other municipal services.

The mandate of local authorities is typically to implement legislation set at the national government level; they have limited power to enact packaging regulation themselves at the local level. In the more developed Asian countries, some municipalities have determined which packaging materials are collected and the collection mechanisms, through kerbside collection service, for example. Here, the municipality influences the options consumers have for disposing of their waste; and they run public education programmes on proper waste disposal. In the much poorer countries, there is often a sense of helplessness as the waste piles up and there is little that can be done to deal with it. Whatever resources are available are directed towards end-of-pipe management to clear away the most visible signs of the problem.

Other than local land use patterns such as zoning laws, municipal authorities have little or no direct influence over locally operating retailers and brand owners. This is especially the case with transnational corporations that are headquartered in another country and have much greater resources than local authorities. Most packaged goods sold at local retail units and supermarkets are not produced in the same locale. While production is done in one municipality, country or continent, consumption is done in another. This gives governments of developing countries with relatively weak economic status rather little influence, and municipalities even less, over flows of packaging. Local authorities are consigned downstream to operationalising waste management policies set at the national level.

3.2 Consumers

Food consumption in developing Asia is largely characterised by a growing dichotomy of co-existence: a rising, assertive consumer class, amid the remaining enclaves and communities of those living in poverty. Consumption takes place within a socio-economic context in which one group exerts itself through consumerism and another group has to scavenge on the resulting waste for its livelihood. Consumption among the emerging Asian middle-class has tended to emulate patterns noticed in the more industrialised countries, as a lifestyle with artefacts to which status is associated. Most of the consumer class is concentrated in cities, responsible for the bulk of consumption that is churning out waste. As an example of this rapid transformation, from 2000 to 2008, Vietnam's GDP grew by 43% in urban areas, along with an emerging middle class with increasing disposable income (Nielson 2008).

Consumers' needs reflect a set of objectives pursued to attain, maintain or improve their quality of life (OECD 2002); they buy to satisfy these needs, or perceived needs. Food designed for convenience and to suit increasingly busy lifestyles needs more packaging; plastic which is light, flexible, durable and impermeable is highly attractive for this purpose. Consumers rely on packaging for food protection, transportation and for information, such as ingredients, instructions for use, and expiry date. Packaging may also have a special cultural resonance. For example, gifts are heavily packaged—the more impressive the packaging, the more impressive the gift. Some consumers now expect major retailer outlets to provide such attractively packaged gifts.

In general though, and away from conspicuous consumption, when a consumer goes to shop, he or she is looking for a product or service, and not necessarily packaging; the packaging is only incidental, an enabler for the product and a differentiator across categories (Brody 2006). While the choice of a consumer is an expression of preference, the consumer only has as many options as are presented on the shop shelf, thereby limiting their ability to reveal their preference to what is available and not necessarily what they desire or with what fits their values. Based on a number of reasons, this choice is an

expression of needs, preference or abilities within a framework and system of provision (e.g., variety of products) that has been presented by the shop or its competitors. Refusal to buy is also such an expression. Saying “no” to the plastic shopping bag, boycotting one shop over the other, or unpacking a product and leaving the packaging at the supermarket instead of taking it home with them are examples of consumer expression observed in some countries. In Asia however, to date, there are few examples of such activism motivated by sustainability concerns.

Lee et al. (2009) discuss increasing brand avoidance as a pattern that demonstrates potential consumer influence. Similar to the effect of boycotts, such discriminatory aspects, if done against unsustainable packaging, would affect the bottom line, and consequently the operations, of the brand owner (Cotte and Trudel 2009). But this is only effective where a consumer has the option of picking between an unsustainable brand and a sustainable one. Faced with a situation where mostly all the food in shops is (unsustainably) packaged, refusing to buy is an unrealistic option. However, where more sustainable options exist, the challenge remains for developing Asian consumers to organise themselves into a critical mass of consumers and express consumer choices that are reflective of the need for more sustainable packaging, under the preconditions that they are aware, active, and associated sufficiently to do so. That organisational aspect is lacking; the authors have been unable to identify effective examples that have led to changes along the value chain as described in this chapter. What comes close are campaigns by NGOs that promote rejection of plastic bags by shoppers, such as Bring-Your-Own-Bag once a week led by the Singapore Environment Council, and a similar initiative under the National Consumer Campaign 2008-2012 by the Federation of Malaysian Consumer Associations (FOMCA). Such campaigns, though politically appealing, are not sufficient on their own, and can even have unintended consequences. Life cycle analysis by the Sustainable Packaging Alliance show that reusable bags have a lower environmental toll than single-use bags, but only when used 104 times, or once a week over two years. The environmental impact of a reusable polypropylene bag used only 52 times is worse than a standard plastic shopping bag (Lewis et al., in press).

Consumer organisations have emerged as the collective voice of consumers. In their activities, they can be classified as working on a) classical consumer protection or consumer rights such as the rights to safety, information, choice and representation, or on b) ecological consumer protection which may or may not include some of the elements of classical consumer protection plus basic needs, redress, education and healthy environment (Akenji 2003). The revised UN Guidelines for Consumer Protection, further expanded in 1999 (UN 2003), have given these consumer organisations a mandate. In developing countries, still locked around questions of basic consumer rights, many consumer organisations have yet to make the signalled transition from classical to ecological consumer protection.

Another factor that, from an environmental sustainability perspective, has negatively affected the potential of consumers is the sway of prices, usually giving prices priority over environmental sustainability. Recent research shows that consumers will buy sustainable products only if “quality, performance and price are equal” (Cotte and Trudel 2009). In Vietnam, for example, 77% of consumers surveyed in 2008 claimed they had changed their shopping outlet because of prices (Nielsen 2008). Since cheaper is generally not more sustainable, it follows that consumers, through the lower-priced choices, are influencing brand owners to search for ever cheaper packaging options. And because environmental resources and end-of-life management costs of these materials are not properly reflected in the costs, the environment loses out in the market pricing equation.

Harnessing the mass of consumers as citizens/voters (Berglund and Matti 2006) presents an opportunity to influence elected public authorities. The potential of consumer education becomes stronger here, where growing environmental and social awareness of sustainability issues, an engaged electorate, or consumers organised by consumer organisations become a viable force for change, ensuring that policy makers and elected representatives place sustainability high on their priority agenda. Groundbreaking work exploring the notion of consumer citizenship has been championed by the Consumer Citizenship Network, and is explored in chapter 3 on education for sustainable consumption.

3.3 Retailers

In this analysis, retailer refers mainly to major outlets (“big box” stores, hypermarkets, supermarkets, like Tesco and Auchan) and retail chains (like FamilyMart and 7-Eleven). Preliminary analyses show that: (1) in terms of numbers, there are many small independent retailers but their packaging-related sales volume is relatively smaller than that of major retailers; (2) small retailers are heavily influenced by trends and behaviours of major retailers; (3) in urban areas where most packaging-related consumption occurs, major retailers are not only becoming trend setters but also driving the bulk of consumption, caring for the consumer class as well as for aspirants to the consumer class who try to emulate the consumption styles of the rich; and (4) unlike major retailers which are organised into powerful interest groups, small retailers are less coordinated.

A wave of supermarket growth hit Asia in the 1990s. Reardon and Gulati (2008) observe that there were hardly any supermarkets in China in 1989; today in six of its largest cities, major retailers have a market share of 94% in non-food goods, 79% in packaged and processed goods, 55% in baked goods, 46% in meat, 37% in fruit, 35% in poultry, 33% in fish, and 22% in vegetables. Given that major food retailers usually deal with processed and semi-processed foods, their packaging impact is high. There were half a million stores in Vietnam in 2007 selling consumer packaged goods, representing a 13% growth in number and 18% in retail value from the previous year (Nielson 2008).

As an interface between consumers and brand owners, retailers perform a balancing act of satisfying consumer demand and also pushing through what the producer wants to sell, while, in several cases, ensuring prominence of their own brand. Major retailers' large assortment attracts many consumers and their fast turnover of products empowers these major retailers as high priority customers of brand owners. Prices in major outlets tend to be cheaper due to economies of scale from centralised procurement and distribution (Fuchs 2006; Reardon and Gulati 2008). Retailers also offer air-conditioning in stores, appear cleaner, and display products in ways that appeal to many consumers. As a result of these perceived advantages, retailers are drawing increasing numbers of customers, away from local and convenience shops and traditional markets.

Over the years, retailers have become increasingly powerful. On the one hand, they press producers to supply on the retailer's terms, e.g., in reduced bulk prices or packaged in specified units. However, on the other hand, they influence consumers into ever increasing consumption that increases profitability. Research shows that supermarket acceptance of sales packaging plays a major role in the packaging decisions of manufacturers and that it likely outweighs the demands of consumers (CWMI 1999). Retail giants such as Carrefour regularly refuse to sell certain products unless they meet specific pricing and packaging requirements (Gereffi and Christian 2009). Such detailed specification is a powerful tool for market influence.

As more and more major retailers are increasing shelf space for their own brand products they are gaining more influence over products and packaging of brand owners' as well. Such retailers play a double role of being both brand owners and retailers. They influence the price for the brands that compete against theirs; they determine which brands get shelved in their outlets and which ones do not, and in doing so select their own competition. They decide on shelf position, display size and prominence of products, advertising and advertising space at the outlets, and marketing activities (e.g., product sampling) on the retail floor by brand owners. These are all factors that have been shown to influence product turnover. However, because the retailer cannot produce all the products that it sells, it still depends on the brand owner for most of its stock.

Major retailers provide employment opportunities in places where they operate. A combination of their strong role in the economy and their financial power gives them considerable leverage over other stakeholders, including local authorities. In all the countries looked at for this study, retailers came together to form national associations to represent their interests. These associations have been successful in influencing local and national decisions on packaging or packaging waste management.

3.4 Brand owners

Developing Asia is still a young market in many respects and presents opportunities for brand owners to both initiate consumption by, and shape the appetites of, new consumers. With growing economies, rapid urbanisation and an increasing consumer class, there has been an influx of transnational food corporations to these countries, followed by small and medium size enterprises (SME) to supply them, and a mushrooming of local businesses to meet demands created by the emerging lifestyles. Asian countries are heavily populated and present a fertile ground for investment. Vietnam, for example, has a very young population, with over a third under the age of 19 in 2000, and more than half under 30. In the two main cities of Ho Chi Minh and Hanoi, a third of the population has access to the internet (Nielsen 2008). This provides opportunities for manufacturers to cultivate and sustain customer loyalty in the key cities among these emerging middle class citizens, who are young and hungry for new brands and products. In fact, several marketing activities target this young segment via media like internet and mobile phones that are adapted to their lifestyles.

Brand owners operate in a fiercely competitive market environment, faced with meeting consumer demands for high quality products at low costs while competing with other brands for shelf space and product recognition. As such, the design and packaging, being usually the first visual contact with consumers, should be distinctive and attractive in order to maximise the market appeal of the product (CWMI 1999). This has provided brand owners with one of its strongest marketing tools. Packaging design for successful marketing is a booming industry of its own and, between the marketing departments of brand owners and the packaging designer, resources are dedicated to "get the packaging right." This has sometimes led to a lopsided product-packaging cost ratio—the packaging costing more than the product itself. In 10 out of 40 food industry sectors, packaging costs exceed the costs of edible foodstuff ingredients (Hicks 2002).

Efficiency in the value chain, getting the product from the manufacturer to consumer is a primary consideration of the brand owner. As well as being cost effective, packaging properly serves to protect and preserve its contents during transportation and storage. Packaging is widely credited with being the key driver for such product successes as extended-shelf-life flavoured milk beverages, fresh-cut vegetables, microwave popcorn, moist pasta, microwave entrees and soups, shredded cheese, and bottled water (Brody

2006). In addition, it is used to communicate information about the product to consumers, like content labels, instructions for use, and expiry dates.

As the packaging “specifier,” the brand owner directly communicates its packaging needs to the producer. Specifications instructing packaging design could be as detailed as the dimensions, material, or sustainability criteria for the packaging: “a static entirety of constraints that packaging development must adhere to” (Oostendorp et al. 2006, 209). The packaging producer may sometimes act as consultant to the process of packaging development. However, ultimately, owners want to keep control over their brand image and have the final say in the decision process. The nature of the product and the brand owner’s sales packaging design in turn influences transport and grouped packaging used by suppliers, distributors and retailers.

In line with maintaining control over packaging design and brand image, major food brand owners often have their own internal packaging units (Brody 2006). Ownership of packaging technology and equipment is expensive, and thus could be a potential impediment to change. Once a manufacturer invests in such expensive technology, logical planning is to see a return on investments over a calculated period. Consequently, even if it becomes clear halfway through the productivity cycle of the equipment that the packaging concept has an ecologically negative effect, if marginal contributions of the equipment to the financial bottom line are still positive, then there is little business incentive to change, especially when the comparative costs of the switch are high.

Although brand owners typically go through retailers to provide consumers with their products, they take an active role in marketing and advertising directly to consumers. As Brody (2006, 111) observes, “companies are expanding their employment of persons with the title of Packaging Vice President and compelling marketing, brand, and product managers to apply packaging as one of their key weapons in the ever-increasing competitive marketplace.” The Internet and mobile phones, examples of emerging technologies familiar to young consumers, are providing brand owners with direct channels to consumers, bypassing retailers. In the presentation of products as answers to the demands of modern culture, busy lives, and youth perceptions, packaging goes beyond being just a container and becomes a product in its own right, catering to the emotional and psychological demands of consumers, most of them under the influence of advertising. This type of packaging especially appeals to the emerging consumer class which views consumerism in industrialised countries as a lifestyle to emulate.

Transnational corporations, most of them coming from industrialised countries and seen to embody the appeal of the Western lifestyle, have had strong effects on the way food is produced and packaged in developing Asia. Local products, not to be outdone by competition, are now taking on standards set by these corporations. Global value chain analyses by Gereffi and Christian (2009) demonstrate that transnational corporations are “drivers of the global fast-food technology, processed foods, and Western cultural norms that have become so prevalent in developing countries. The global-local interactions they spark accelerate the speed at which local food producers, manufacturers, and retailers adopt transnational businesses strategies and tailor them to domestic needs” (*ibid*, 10).

Traditional foods, such as noodles and rice, are now being processed to suit the urban lifestyle. Brand owners such as Ajinomoto and Nissin produce instant noodles and rice, packaged in paper, plastic or Styrofoam cups and available for the busy city dweller to “just add water” and be on the go.

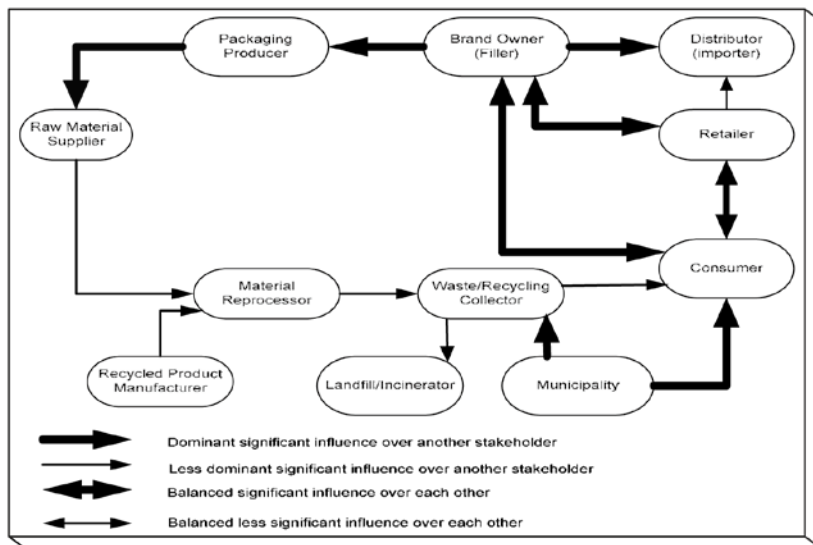
Research and development by companies provides a lot of knowledge to improve existing product quality, develop new products and technologies, or find out new ways of penetrating the market. Brand owners continuously mine data to understand the psychology behind consumption, consumer tendencies and behaviour and how these can be used to draw consumers in. The development of packaging is one field in which consumer psychology is being continuously and intensively studied with a view to driving ever higher consumption.

Brand owners are also influenced by their shareholders, especially where their consumer base or financial bottom line is in question. Given the nature of corporations—which most influential food companies are—shareholders expect returns on their investments. With a competitive market structure and a strong emphasis on shareholder value, there is little space for long-term planning as is required for sustainability. Management, usually different from owners or shareholders, tends to pay the price when its decisions, even when well-intentioned (as is the case with becoming more ecologically friendly), cannot be communicated in the traditional business language to shareholders. A positive change, however, can be observed in the rapid rise of ethical investors, such as large pension funds, that demand improved sustainable performance from the companies they invest in. In the absence of regulation and consumer pressure, corporations can only go so far with cosmetic changes and in final accounting cannot help but be what they are legally defined to be—where the financial bottom line has priority over ecological considerations.

4. Stakeholder salience

Figure 2.2 summarises the relationships and influences among stakeholders in the packaging value chain, based on analysis done in this study. The degree of influence exerted by one actor over the other is indicated by the size and direction of the arrow. Dominant significant influence by Actor A over Actor B indicates that A has more influence over B than B has over A, and that A has more influence over packaging decisions than B.

Figure 2.2 The product-packaging chain, showing relationships and stakeholder influence on packaging sustainability (direction and relative size)



Source: Authors

As demonstrated in the preceding analysis, individual consumers currently have relatively little influence to change market behaviour. The retailer predetermines the variety, size and packaging and has sophisticated ways of influencing consumer decisions, although ultimately it is the consumer who buys the product. As such, the consumer and the retailer tend to have a balanced significant influence over each other. Similarly, there is a balanced significant influence between the consumer and the brand owner. However, because the retailer and brand owner double their influence over the consumer, the consumer ends up with less influence over both of these actors and thus, at least in the area of packaging, can hardly drive change along the entire value chain. This has already been inferred through several studies (see, for example, Fuchs and Lorek 2005; Sustainable Consumption Roundtable 2006). By implication, consumer awareness programmes alone are not sufficient, nor should they be the primary focus of achieving sustainable consumption.

The *nexus of influence* is around the retailer and the brand owner. Their combined influence sways decisions in the value chain. Even if consumers wanted more sustainable packaging, it would still rest upon this dominant significant nexus to introduce such packaging. Government policies that ignore such strong influences are unlikely to be effective. Of particular importance to these actors are their large shareholders, many of which are becoming increasingly concerned about sustainability issues.

The municipality, although it bears the costs of waste management, has little direct influence over the production process. It does have influence over the waste management systems and waste disposal options available to consumers. This partially explains why it is common for municipalities to talk of influencing consumer behaviour and proper waste disposal than engaging with the powerful nexus of retailers and brand owners trying to change the upstream stages of the value chain. Thus waiting for the green consumer and the concerned municipality to act alone will result in insufficient impact up the value chain. National governments must empower these downstream actors to be able to act on the issue, and any set of policies that effectively tackles unsustainable packaging must primarily engage the brand owner and retailer as part of a multi-stakeholder approach.

4.1 The lead actor

The Triple I model identifies where influence comes from, and thus who has the most power in the value chain. This is called the lead actor. The concept is adapted and redefined from “lead firm” as contained in the global value chain model by Gereffi and Christian (2009). The following are characteristics of the lead actor:

1. has majority ownership or legal rights (patents, copyrights, court registration, etc.) over the final product or brand;
2. has a critical marketing, technological, or financial edge that permits it to set the standards or specifications for other actors in the value chain;
3. defines the product and choice of market route, including production, presentation (e.g. packaging) and distribution;
4. has agency—the ability to find a meaningful response to the situation, the resources to change its own behaviour, hence pulling others along.

From the Triple I stakeholder analysis, the nexus of influence in the packaging value chain is around the major retailer and brand owner. Most of the specification of packaging is done by these two actors. They are engaged in production and distribution; have influence over suppliers and availability of retail outlets, hence consumers; and they have the financial leverage and are well organised into assertive self-interest groups.

Yet while major retailers like supermarkets are influential and have become increasingly powerful, in the processed food value chain where packaging is most rampant, the dependence of the retailer on brand owners for the full extent of its supplies ultimately leaves the brand owner with more influence. However, as has also been discussed, major retailers are beginning to develop their own brands, which makes them brand owners, too. By targeting the brand owner to change practices within the value chain, the major retailer would be included as well, thus engaging every actor in the nexus of influence. A good way to further understand the potential of the brand owner as a change agent in the value chain is to place it against the characteristics of the lead actor as listed above.

Nestlé, for example, as a lead actor, is the world's largest food company with control over key technological or information assets that allows it to establish the parameters that other major actors in the processed and semi-processed food industry must comply with. Nestlé has direct control of key stages in the supply chain, product and process standards for its star brands like Nescafé, Perrier, Maggie, and it is technologically innovative to come up with and push through new products that redefine the market, such as the Nespresso coffee machine and capsules.

Gereffii and Christian (2009, 5) write that frequently lead actors “exhibit more power in influencing behaviour in an industry than government laws and regulations. The latter are typically hindered by enforcement difficulties, whereas if suppliers do not comply with lead firm standards, they face harsh penalties or can be dropped from the chain.” In issues as complex as packaging and with many stakeholders involved, rather than developing Asian governments casting wide-net policies, they should be targeting brand owners to act more sustainably and demand the same from those they have direct or indirect significant influence over. Institutional shareholders, like pension funds, and other ethical investors may be an important source of leverage. Furthermore, SMEs in developing countries generally lack the resources to move rapidly towards environmental sustainability; governments should ensure that large companies provide sustainability leadership to these SMEs that often serve as their suppliers.

5. Prevention approaches to unsustainable packaging

There are two approaches recommended here for policy makers: choice editing and extended producer responsibility (EPR). Choice editing has two advantages: it is a preventive approach to unnecessary packaging, as well as avoidance of the more unsustainable packaging materials and design. By editing out the bad options, it also prevents consumers from having an unsustainable option on the shelf. But waste cannot be completely eliminated, and for waste which choice editing cannot prevent, EPR is used to allocate responsibility. By distributing among stakeholders and shifting primary responsibility to the source, EPR lifts the burden from resource-starved municipalities and places it on the actors that are most responsible for creating the waste in the first place. These approaches are recommended based on the outcome of the Triple I value chain analysis and should be implemented in tandem.

5.1 Choice editing

The term choice editing was coined by the Sustainable Consumption Roundtable, a group of leading experts in consumer policy, retailing and sustainability. It has recommendations on creating consumer choices that stay within environmental limits. One of its reports, “I Will If You Will” (Sustainable Consumption Roundtable 2006),

examines how to mainstream sustainable consumption and concludes that, given the scope and urgency of the issue of sustainability, and considering the multiple influences on consumer decisions, it is not practical to place the burden on consumers; “the lead for ensuring environmental stewardship must lie higher up in the supply chain” (*ibid*, 16). Among its recommendations is choice editing.

Choice editing involves the use of specified factors and set standards to filter out unsuitable options in the range of products and services available to consumers (Box 2.1). It is done by manufacturers and service-providers when they decide which products and services to offer, and to what specification based on profits, available technology, or social need, for example. And as already established, retailers choice edit what products they shelf so packaging could be an influencing factor in this choice of products.

Governments can also use choice editing to eliminate unsustainable products or services, or to encourage development of sustainable ones which may otherwise not be available. This will influence resource use, production, and consumption. Consumer choice and behaviour are a function of the options available to them, or, in other words, a response to government policy, manufacturers’ and service providers’ choices, and retailers’ decisions on what to (or not to) shelf. In our analysis, in this context the consumer is not really king after all.

The phasing out of incandescent light bulbs from domestic use in Australia, the European Union, and now being considered by Asian countries like China are contemporary examples of governmental choice editing driven by sustainability concerns. Likewise, the ban on plastic shopping bags from supermarkets by several countries can be seen as first steps towards choice editing for packaging. Governmental choice editing has been around for a while and can be found in all countries. It is commonly used for protecting consumers and for public safety. For example, in most countries a consumer cannot just walk into a shop and buy a pistol. This unsafe option has been edited out of the market. Similarly, the use of toxic lead-based paints on toys has been banned in many countries. Choice editing is therefore not new, having been a strong basis of public policy.

Traditionally, most choice-editing criteria used in public policy related to production and consumption has been based on economic growth, health and safety. Except for more recent policies, any environmental benefits have mostly been incidental. Nevertheless, world leaders have acknowledged through Agenda 21 that “the major cause of the continued deterioration of the global environment is the unsustainable pattern of consumption and production” (UN 1992a, 4.3), and states have declared their commitment to “reduce and eliminate unsustainable patterns of production and consumption” (UN 1992b, Principle 8). Governments are therefore obligated to incorporate sustainability factors into choice editing policies for products and production, and to set standards high yet practical enough to eliminate social and environmental pressures.

Box 2.1 Sample logical flow for applying choice editing

- i. **Needs:** What function does the packaging have? Which stakeholder needs it and at which stage in the value chain? How is it being used, and what are the drivers and patterns of its use?
- ii. **Sustainability:** Is production, use and disposal of the packaging sustainable? Life cycle approach would be an example of a tool to understand the sustainability of a product from “cradle to cradle,” or along its entire life cycle.
- iii. **Alternatives:** Are there any (more sustainable) alternatives to the packaging or packaging material that would carry out a similar function and provide similar utility?
- iv. **Costs:** What are the comparative costs—environmental, financial and social costs—of either developing new packaging alternatives or mainstreaming existing ones?
- v. **Edit:** Based on the previous steps, the government could then decide to edit out the existing choice and how. Choice editing requires what the Sustainable Consumption Roundtable (2006, 22) calls a “clear road map for rapid product change,” facilitated by government and with the full involvement of key stakeholders.

Source: Authors

5.2 Extended Producer Responsibility

Davis et al. (1997) describe a situation thirty years ago in industrialised countries that is still the predominant reality of developing Asia:

Regulations have focussed on controlling the pollution outputs from individual firms within the product chain without regard to the linkages to other stages of the product chain. Under this limited view of environmental responsibility, solid waste management, for instance, has been the responsibility of the individual householder or the local government acting on his or her behalf. Traditionally, the producer of the disposable product packaged in multiple layers of non-recyclable packaging has not been viewed as having any responsibility for the product or package when they become waste. As solid waste burdens have increased and tightening disposal regulations have made solid waste management more expensive, the budgets of local governments have been stretched thin, and local taxes have been increased. At the same time, the siting of solid waste facilities has become a major political battleground. Local governments have been saddled with the responsibility for a problem that is not of their own making and about which they can do little on their own to prevent.

Furthermore, due to their limited influence over upstream stages of product value-chains, municipalities are left with short-term, end-of-pipe solutions to a problem that is integral to our production and consumption system. Addressing it from the outcome rather than the source is unlikely to curb the rapid rate at which packaging waste and its related consequences are growing. While in principle this is widely recognised, there remains the challenge of taking the pressure off ill-equipped municipalities and addressing the source itself, where the waste is being generated and where the crucial decisions are being made.

Over the last three decades, some industrialised countries have used extended producer responsibility (EPR) as an approach to address the above situation. It is an environmental policy approach in which a producer bears responsibility for a product and its environmental impacts throughout the product’s life cycle, including upstream impacts arising from the choice of materials through the production stages, to downstream

impacts during the consumption and post-consumption stages (Davis et al. 1997; OECD 2001). In theory, EPR combines both the polluter pays principle and design for the environment, making it suitable as a packaging waste prevention approach by: (i) shifting responsibility (physically and/or economically, fully or partially) upstream toward the brand owner and away from municipalities, and (ii) providing incentives for brand owners to incorporate environmental considerations in the design of their packaging (OECD 2001). Although in principle the latter is implicit, in practice the implementation of EPR has mostly been towards post-consumption waste management, especially recycling and incineration. This has benefited towards increasing recycling rates and reducing landfill disposal, but it skirts the benefits of waste prevention at source, such as reduction of resource consumption and pollution.

EPR cannot place all responsibility on the producer; in order to function properly, other actors along the value chain need to be assigned appropriate responsibilities. Properly applied by government, EPR presents an opportunity for multi-stakeholder engagement and to use a policy mix influencing all actor groups such as, in the case of packaging, producers, retailers, consumers, and local authorities.

A wealth of literature already exists on EPR (e.g., Davis et al 1997; Lindhquist 2000; Lewis 2003) so further explanation shall be avoided here. The OECD (2001) *Extended Producer Responsibility: A Guidance Manual for Governments* is a good publication with which to start. More recently, IGES' *Extended Producer Responsibility in East Asia: In Consideration of International Resource Circulation* (Hotta et al. 2009) explores practical interpretations in the Asian region.

EPR is not a given set of specific policies but a principle that guides policy making. The approach is recommended here not as a stand-alone but to complement a more proactive waste prevention approach such as choice editing. It is recognised that there are challenges to EPR policies (Bengtsson et al. 2009) owing to the limited implementation capacity of developing Asian countries. As such, while a prevention approach could be used to heavily reduce the amount of waste generated, EPR would complement it in allocating responsibility to which actor should be dealing with the waste that eventually passes through the choice editing filter. To make the application of EPR more realistic in developing Asia, national packaging review panels are recommended (below).

6. Recommendations

Among this chapter's specific recommendations are:

- to create national packaging review panels, constituting packaging stakeholders to continuously review the packaging situation, pre-empt emerging trends, evaluate policy options, and advise stakeholder groups, with a view to advancing more sustainable packaging;
- harmonise packaging across brands of similar products, and make them refillable, in order to reduce the need to constantly produce new, individually tailored single-use packaging; and
- further harmonise packaging standards and national policies across countries of the region, reducing the complications for brand owners to develop different types of packaging for different countries of the region and facilitate the potential to achieve major reductions across a wide market bloc.

6.1 National packaging review panels

Packaging patterns are affected by several factors, with variations from one country to another. Rather than follow generic recommendations, each country should set up a multi-stakeholder national packaging review panel (PRP) to integrate issues of packaging design, packaging and packing waste at a system level. A PRP creates an opportunity to examine the country situation and to be able to adapt any of the large pool of tools and instruments available for shifting towards more sustainable packaging.

Most countries have stakeholder groups, such as national packaging associations (e.g., Packaging Council of Malaysia) and federations of consumer organisations (e.g., Indian Consumer Education & Research Society,) which would be legitimate stakeholder representation on a PRP. However, PRPs need to go further than limited interest groups, and have a broader and more immediate mandate that integrates environmental and social factors more forcefully. Under the leadership of the government, such a panel should constitute a wide representation of actors affecting or affected by packaging, participating towards formulation of solutions and taking responsibility for implementation. As demonstrated by the Triple I analysis, it is important to take into consideration the role of each stakeholder and the influence it has on the value chain. Suggested salient stakeholders in the packaging value chain are policy makers, brand owners and retailers, researchers, environmental groups, consumer groups, local and municipal authorities, and independent experts (e.g., on packaging design, marketing, communication).

PRPs would continuously review the packaging situation, pre-empt emerging trends, evaluate policy options, and advise stakeholder groups, each in a manner tailored to the national situation, with a view to advancing more sustainable packaging. It would provide input to and make recommendations for government policy. Brand owners and retailers at the nexus of the value chain could be charged a fee towards funding the panel. A dedicated PRP secretariat, with a strong mandate and independent experts, can save the country high future costs and contribute to shifting the country towards sustainable patterns of production and consumption.

Following are some policies which national governments and PRPs could consider.

Policies for choice editing packaging

Based on discussions in the PRP, the government could set minimum sustainability standards for all consumer packaging, any options below which should all be edited out of the market. Examples include laminated or otherwise complex material combinations with waste either too demanding to manage or hard to recycle with net environmental benefits. Standards should reflect the technical and institutional capacity in each country, and overall operate within environmental constraints. As far as can be enforced, reductions in packaging, e.g., size, volume, thickness, should be mandated. The Chinese Excessive Packaging Law targets product and packaging cost ratios, free space ratios, and maximum number of layers of packaging for a range of products. The South Korean Ordinance on the Standards of Packaging Methods and Materials sets “empty space ratio” goals for most product packaging: an Act restricts the use of disposable cups, plates, plastic bags and paper bags in restaurants, public baths, and department stores, among other places.

The challenge for choice editing is to find where the right minimum standard should be set, in a way that is both feasible to implement and effective in solving the problem without creating overall negative consequences. Bans, taxes, subsidies and phase-

outs are only a few of some traditional tools for choice editing; creative policies could also be more accommodating to diverse stakeholders. While some packaging types already have more sustainable alternatives, some might not. In a market economy, the government would have a critical role to play in “nudging” the market towards adoption or development of viable alternatives, and the consumer to accept these new forms of packaging.

While editing out more unsustainable options, governments should simultaneously provide incentives that will introduce more sustainable ones. Although the potential of bio-degradable plastic as a full scale replacement of petroleum-based plastic is debatable (Song et al. 2009), limited but ingenious applications of such materials could have multiple benefits. For example, using bio-degradable plastic for disposable plates and cutlery used at events takes away the need for source-separation of waste since both the food remains and bio-degradable plastic can then be dumped into one organic waste bin for composting. Countries could initiate pilot projects to evaluate the performance of bio-based plastics, biodegradable, as well as other new materials, and their applications as potential substitutes to current, unsustainable packaging materials. Traditional packaging materials should also be re-examined. For example, India still uses plates and bowls made out of leaves for roadside food vendors, which are left for the roaming cows to clean up.

Packaging bans and reductions must be complemented by government measures to promote food systems that need little or no packaging. For example: providing strategic space (such as centrally located land or stalls) in cities for local produce markets will encourage consumption of local foods with minimal packaging, which is a viable alternative to shopping in supermarkets. It would further encourage (traditional) food processing methods such as drying and salting (Hicks 2002), or urban and peri-urban agriculture (Anh et al. 2004) that reduce the need for packaging.

Packaging harmonisation

Within similar product groups, most packaging variations are intended to differentiate brands and consumer segments. But this can also be achieved through simple labelling rather than different types of packages. Thus brand owners in similar product groups could be required to develop common packaging standards, the packaging harmonised, and, where a life-cycle perspective demonstrates net benefits, make the packaging refillable. This will reduce the need to constantly produce new, single use packaging as harmonised packaging can be used across brands and repeatedly. A case in point is in Vietnam where beer bottles and distribution crates have standard sizes and shapes, allowing breweries to use them interchangeably. Brands are differentiated by labels printed on paper and placed on the bottle. Furthermore, because they are reusable and there is a refund fee, consumers easily return empty bottles and crates. Packaging for jam and fruit juices could adopt such a system. Governments should work with national packaging associations in evaluating such systems from a life cycle perspective and promote or mandate more sustainable solutions.

Countries of the region should act in collaboration with each other to be effective and to achieve large scale results. Standardising packaging requirements and harmonising policies across these countries will provide aggregate strength to ensure that brand owners, and especially major transnational companies, comply with agreements on extended producer responsibilities for the packaging they produce. It also makes it easier for the companies to streamline to one set of packaging policies following common regional requirements. Furthermore, large scale positive changes in packaging will

also translate to larger sustainability gains. The Asian Packaging Federation (APF), for example, stands in a good position to co-facilitate such harmonisation. APF, an industry umbrella organisation of national packaging associations, has an objective to enhance cross country cooperation among packaging-related bodies, including education, package development, and environmental aspects as well as laws and regulations.

Policies for extended producer responsibility

Using EPR principles can guide Asian countries towards better packaging waste minimisation strategies. Japan, Taiwan and the Republic of Korea have regulated approaches. Introduced in 1995, Japan's Packaging Source Separation and Recycling law gives producers responsibility for recycling consumer packaging. The government sets targets based on recycling capacity. Others, like Australia and Singapore, have voluntary approaches to EPR. The Singapore Packaging Agreement came into effect in 2007 and focuses on the food and drink industry. Action plans are prepared by individual industry sectors and concrete targets set to reduce packaging waste from various packaging materials.

There are several policy instruments that can be used to extend producer responsibility over packaging (OECD 2001). With *take-back requirements*, producers have the responsibility to take back packaging for their products at the post-consumer stage. *Performance standards* determine the extent to which producers are required to recycle their post consumer products, and may regulate how recycling should be done. These standards provide incentives to producers to avoid packaging, or choose packaging that is easy to reuse and recycle, with minimum impact on the environment. Application of EPR should have clear objectives, clear targets, and clear roles for each actor, along with incentives for compliance and penalties for non-compliance.

An effective EPR system requires clear identification of the producer of the packaged product; here it is the brand owner, the lead actor in the value chain. In addition, the retailer being part of the nexus of influence will share with the brand owner the bulk of responsibilities, including bearing most or all of the costs for collection, transportation, storage and treatment of packaging waste. These actors however do not need to physically execute all these activities. In Japan, companies pay a fee to the Japan Container and Recycling Association for the costs of managing the packaging waste. Those at the nexus of influence could set up a third-party entity providing physical infrastructure and handling the physical activities of packaging waste management. EPR gives brand owners incentives for triple benefits that can be derived from packaging avoidance or reduction: reduced packaging costs, reduced packaging waste management costs, and reduced negative effects on the environment.

To ensure that waste prevention is priority, brand owners should review their product packaging periodically and submit the review with improvements in packaging for specific products over the past term, new types of packaging introduced, planned packaging for the next term and planned improvements. Australia's National Packaging Covenant requires each party to submit a three- to five-year plan to meet the Covenant's obligations, prepare annual progress reports, and contribute an annual fee that is used to fund recycling. The Singaporean Agreement requires annual sector reviews. We however recommend a three-year review term as this is more compatible with strategic business review cycles; brand owners would have time for planning as well as to study effects of introduced packaging changes to the market.

To provide incentives for public participation and to ensure a functional take-back scheme, waste should be given economic value and treated as a resource. *Deposit/refund schemes* involve the consumer paying a deposit when purchasing a product and then receiving a refund of the deposit when returning the post-consumer product, the container, or the packaging. The aim is to facilitate product take-back.

From 2000, Taipei, Taiwan started charging a per-bag trash collection fee, based on a so-called “Pay As You Throw” scheme (Chen and Huong 2004). This is comparable to that of Korea: the Volume Based Garbage Collection Fee system that charges per garbage bag discharged per household. Authorised bags can be bought in grocery and department stores; unauthorised bags or illegal waste dumping are fined. Korea and Taiwan however benefit from having relatively stronger state institutions and more organised systems; in other countries, the risk is that people will turn to illegal dumping to avoid paying. Governments and PRPs should evaluate their enforcement capacity in advance, and as a component of their strategy, develop engaging programmes on education for sustainable consumption (see chapter 4 on education for sustainable consumption).

7. Conclusion

The paradox of SCP in the contemporary economic system is that the consumer might be at the centre of the consumption process, but for many crucial decisions in the value chain he or she is not the most influential actor. This is not to downplay the contribution the consumer can make or the importance of enabling greater consumer empowerment; however, to ensure effective environmental gains through SCP, producers must take primary responsibility. The brand owner, as seen through the Triple I analysis, has the power to influence the value chain to bring about transformation. It is the role of the governments to ensure that this transformation takes place.

As for consumers, rather than cosmetic changes in individual behaviour, sustainable consumption should modify attitudes and the systems that facilitate or constrain behaviour, and the infrastructure that is used. This goes beyond just consumer education or simple information provision, a topic at the heart of the discussion in chapter 3 on education for sustainable consumption. Even with a high number of ecologically literate consumers, sustainable consumption can only be actualised if there is the infrastructure to enable sustainable lifestyles and there are sustainable products on the shelf.

To enable sustainable consumption at a systems level, three elements are needed and should operate in concert with each other:

- i. the right attitude from consumers: here, education for sustainable consumption is central;
- ii. being mindful of the attitude-behaviour gap (Osterhus 1997): a facilitating system is needed to convert consumer attitudes into action. This includes incentives for participation, standards to guide consumers and producers, regulatory and economic frameworks that enable or constrain consumer choice; and
- iii. appropriate infrastructure should be in place. This may be physical infrastructure, technology, products and services.

Because infrastructure tends to have a “lock in” character—framing consumer behaviour throughout the use phase—it is important for it to incorporate sustainability considerations

at the design phase. Government and policy makers should consider balancing the above three pre-conditions in the design of policy towards sustainable consumption.²

Notes

1. This analysis is based on work by the Global Values Chain Initiative hosted at Duke University (<http://www.globalvaluechains.org/>) and especially on the paper by Gereffi and Christian (2009).
2. Research for this chapter was conducted partly under the Asia Resource Circulation Research Promotion Programme, a project commissioned and funded by the Ministry of Environment of Japan under the Regional 3R (reduce, reuse, recycle) Forum in Asia.

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Chapter 3

Pathways for Promoting Sustainable
Consumption: How governments can
initiate effective Education for
Sustainable Consumption

Chapter 3

Pathways for Promoting Sustainable Consumption: How governments can initiate effective Education for Sustainable Consumption

Mee Young Choi and Robert J. Didham

1. Introduction

The main objective of this chapter is to provide a clear pathway for governments to implement effective Education for Sustainable Consumption (ESC) programmes that enable and encourage consumers' proactive participation in sustainable consumption.

This chapter's look at ESC is developed by seeking answers to the primary research question: *How can governments effectively influence consumer decision making through education for sustainable consumption?* The result of this analysis is a holistic and strategic approach for advancing ESC knowledge, practice, and policy in the Asia-Pacific region.

The development of ESC strategies links closely with the United Nations Marrakech Process on Sustainable Consumption and Production (SCP) led by the United Nations Environment Programme (UNEP) and the United Nations Department of Economic and Social Affairs (UN-DESA). One of the four main policy themes that have been highlighted as areas of focus for the Commission on Sustainable Development (CSD) to address is "changing consumer behaviour" through the application of policy instruments on consumer education and information provision. In 2010-11, the 18th and 19th sessions of the Commission on Sustainable Development (CSD-18/19) will review the findings of the Marrakech Process and develop a Ten-Year Framework of Programmes (10YFP) on SCP. In the current draft of the 10YFP on SCP, education on SCP and sustainable lifestyles is identified as one of the priority programmes to be elaborated (UN-DESA/ UNEP 2009).

Chapter Highlights

This chapter investigates government mechanisms for implementing strategic Education for Sustainable Consumption (ESC). ESC is vital to increase individual participation in sustainable consumption, and also to provide the means for an individual to begin to incorporate the principles of sustainable development into everyday life. Specifically, this chapter will look at the following areas:

- Consumer education for sustainable consumption should address ways to influence the individual consumer at the level of personal decision-making on consumption and how to develop a supportive social infrastructure that fosters sustainable consumption.
- The identification of the five primary mechanisms to promote sustainable consumption provides the basic outline of how ESC is understood and investigated in this chapter.
- Policy implications for the general structure and specific content of effective ESC policies are highlighted.
- A Five-Point Strategy to plan ESC provides a step-by-step process for planning and implementing an effective campaign on consumer education for sustainable consumption.

During a regional workshop on ESC hosted by IGES in Beijing in July 2009, government officers from Japan, China and the Republic of Korea agreed that current governmental capacity in Northeast Asia for addressing ESC is insufficient due a critical lack of evidence on what constitutes effective ESC policies and how to prepare cost-effective ESC strategies. It was further highlighted at this workshop that advancing ESC leadership and strengthening governmental capacity for executing ESC are priority concerns for achieving sustainable consumption and the transition to a low-carbon society (IGES 2009).

The governments of Japan, China and the Republic of Korea have all provided mandates to their governmental agencies to begin the promotion of responsible consumer behaviour for a low-carbon society and to initiate educational campaigns on sustainable consumption. For example, the Japanese Cabinet Office established a group on Consumer Citizenship for Sustainable Consumption in its Economic and Social Research Institute to provide support for the Consumer Affairs Agency to promote sustainable consumption.¹ At the Eleventh Conference of the National Party of China in 2008, a new mandate was agreed for “the promotion of green consuming” to correlate with the Circular Economy Promotion Law (effective 1 January 2009). The Centre for Environmental Education and Communication, an agency of the Ministry of Environmental Protection, was given the mandate to promote green consuming and initiate ESC.² The Korean Presidential Committee on Green Growth established a Green Lifestyle for Sustainable Development Team and coordinates national activities on Education for Green Growth, including consumption practices.³ However, although the political mandate and will-power exists to enact ESC programmes in these three countries, they remain essentially unformulated because of the current lack of capacity and leadership for ESC within these governments.

1.1 Key concepts of investigation

Education

Education is often thought of in the narrow sense of formal education that occurs in schools and universities. However, in a broader sense, education includes formal, non-formal and informal education. Formal education is what is usually recognised as the “education system” and is usually hierarchically structured around curriculum-based learning. Non-formal education in general is structured educational activities that occur outside of formal education. These non-formal educational activities include professional training, community-based education and consumer education campaigns. Furthermore, non-formal educational activities are usually short-term, practical-based and learner-centred but with identifiable learning objectives. Informal education describes the life-long learning process that occurs through daily living and experience. Informal education can be bolstered with appropriate knowledge/information provision and with effective learning tools (Infed 2009). In relation to this chapter, non-formal education is given slightly greater emphasis for increasing consumer practice in sustainable consumption, although all forms of education are needed.

The concept of education considered in this chapter, and in ESC in general, is viewed from a non-traditional understanding that advances a new pedagogical theory for the focus and processes of education and learning as a whole. This incorporates a broad scope for education that includes both the teaching and learning of knowledge, skills, morals and behaviour patterns that advance an individual’s development and socialisation. The UNESCO Task Force on Education for the Twenty-first Century identified four main pillars of learning in *Learning: The treasure within* (1996): learning to know, learning to do, learning to live together, and learning to be.

Learning to know is the process of mastering learning tools and building the capacity to be a life-long learner. *Learning to do* focuses on occupational training and educating people to be valuable assets in their employment while also acknowledging the adaptive labour needs of the modern market. *Learning to live together* entails the incorporation of education into citizenship and social life, thus providing individuals with the abilities to participate in cooperative communities. Finally, *learning to be* entails supporting the full development of each individual and their self-expression (Delors et al. 1996).

Education for Sustainable Development

Education for Sustainable Development (ESD) is promoted as a process to engender a culture that is respectful to the core principles of sustainable development, and ESC is often identified as an important ESD component rather than a separate, stand-alone process. United Nations Educational, Scientific and Cultural Organization (UNESCO) define “education for sustainable development” in three parts:

- Education that enables people to foresee, face up to and solve the problems that threaten life on our planet.
- Education that disseminates the values and principles that are the basis of sustainable development (intergenerational equity, gender parity, social tolerance, poverty reduction, environmental protection and restoration, natural resource conservation, and just and peaceful societies).
- Education that highlights the complexity and interdependence of three spheres, the environment, society—broadly defined to include culture—and the economy (UNESCO 2005, 5).

For ESD, a fifth pillar is added to the pillars of learning identified in *Learning: The treasure within* (Delors et al. 1996), discussed in the previous section. The fifth learning pillar is referred to as “*learning to transform society and change the world.*” The objective of this fifth pillar is for individuals to gain the skills and knowledge to achieve social goals such as social equality, non-discrimination, social solidarity, transition to a low-carbon society and to live sustainably (Shaeffer 2006).

ESD is an important component of sustainable development, with 2005-2014 dedicated as the UN Decade of Education for Sustainable Development (DESD), with UNESCO as the lead organisation. The main priorities of the DESD have their roots in the objectives detailed for education in chapter 36 of *Agenda 21* (1992). UNESCO also draws links between efforts on DESD, the Millennium Development Goals (MDG), Education for All (EFA), and the United Nations Literacy Decade (UNLD) (2003-12). The overarching goals of DESD are outlined by UNESCO as:

- Promote and improve the quality of education: The aim is to refocus lifelong education on the acquisition of knowledge, skills and values needed by citizens to improve their quality of life.
- Reorient the curricula: From pre-school to university, education must be rethought and reformed to be a vehicle of knowledge, thought patterns and values needed to build a sustainable world.
- Raise public awareness of the concept of sustainable development: This will make it possible to develop enlightened, active and responsible citizenship locally, nationally and internationally.
- Train the workforce: Continuing technical and vocational education of directors and workers, particularly those in trade and industry, will be enriched to enable them to adopt sustainable modes of production and consumption (UNESCO 2009a, 7).

One of the major challenges facing ESD is the fact that it is a very diverse and complex subject. Some of the topics it incorporates are practical, while others can be highly theoretical or even disconnected from daily life – which includes broad sweeping criteria that shift between democratic participation and ecological restoration, to poverty eradication and universal health care. Of course, all of these issues are important if we want to achieve a shift to a sustainable society, but it also creates a challenge for providing a clear pathway for sustainability learning and practice. In light of this challenge, sustainable consumption provides a narrower, practical topic of focus that allows for deeper exploration of many of the thematic issues surrounding sustainable development.

Education for Sustainable Consumption

Sustainable consumption is a topic that most individuals can understand directly within the context of their daily lives, and thus as a sub-set of sustainable development, sustainable consumption is a practical activity through which people can practice the elements of sustainable development. ESC has a two-fold objective: first, to advance participation in sustainable consumption practices; and second, to provide a tangible entry into the wider “philosophy” of sustainable development. Although ESC provides a specific topical focus, it also allows for and necessitates a broad investigation of social, environmental and economic aspects to truly understand what makes specific consumption practices sustainable or not.

ESC is thus considered a part of ESD, and it is recognised as a very valuable arena for displaying feasible applications of the underpinning principles of ESD. The mid-term report for DESD expands on this idea:

Education for Sustainable Consumption (ESC), a core theme of Education for Sustainable Development, is essential to train responsible citizens and consumers in this context: individuals need to be aware of their fundamental rights and freedoms, appropriately informed to participate actively in the public debate, oriented towards a conscientious participation in the markets. Hence, ESC has become a core component of ESD and global citizenship and generates awareness of the interrelatedness of central ESD issue (UNESCO 2009b, 50).

Sustainable consumption provides an educational topic for the wider theories of sustainable development from which the individual can apply direct practice to their daily life through sustainable consumption choices, and in so doing, gain a greater understanding of and contribute to the broader goals of a transition to a sustainable society. As Thoresen (2008, 9) states, the main challenge in relation to education for sustainable consumption is how to support initiatives which stimulate the individual's awareness of the central role they play in forming society and empower them to choose responsible, sustainable lifestyles.

ESC is investigated in this chapter as a primary means for advancing the proactive participation of individual consumers in sustainable consumption. Education is not viewed as the only means for promoting sustainable consumption, however, and in many cases regulatory or economic instruments may produce more immediate, if not more effective results. However, educational instruments, coupled with information provision, address the consumer as a free-willed individual with the right to choose to participate (or not) in sustainable consumption. Regulatory and economic instruments act upon the consumer directly or indirectly through command and control policies and incentives or disincentives, for example, while education encourages a reflective self-transformation by the individual in his consumption practices. Similarly, there are many stakeholders who influence the consumption chain, depending on context, and although consumers may have little influence

across many aspects of the consumption chain they remain an important stakeholder in the process since ultimately they are the ones making the final decision to purchase.

1.2 International consensus on Education for Sustainable Consumption

Building on the structure of SCP, a strong impetus for ESC has developed—especially since the World Summit on Sustainable Development in 2002. Following this, the Marrakech Process began in April 2003 as an international fact-finding collaboration with the primary goal of producing a 10-Year Framework of Programmes (10YFP) on SCP in 2010-11. These two years remain crucial for producing strategic evidence based on ESC research as a build up to the implementation of a 10YFP on SCP as the result of the Marrakech Process. UNESCO/UNEP have provided guidelines for future advancement of ESC:

- Introduce sustainable consumption issues into school curricula, materials, and teacher kits.
- Include indigenous knowledge on sustainable development and sustainable consumption, as well as media literacy into curricula and teaching materials.
- Promote among education experts and governments the potential for developing curricula, which combine media education with environmental education.
- Explore the possibility of developing more workplace learning activities on sustainable consumption for the young and the elderly.
- Identify ways to involve young people in decision-making such as giving them seats on an advisory council of an institution.
- Develop and implement an awareness raising campaign on sustainable consumption and shopping behaviour in collaboration with the advertising industry (UNESCO/ UNEP 2001, 195-6).

There remains significant scope to examine how international policy can effectively promote the implementation of ESC initiatives at national and local levels (See Box 3.1 for an outline of key international agreements on SCP and ESC.)

Box 3.1 The historical impetus for ESC in international policy

1992, June – Rio Earth Summit: SCP is outlined in “Chapter 4: Changing Consumption Patterns” of *Agenda 21*.

2002, September – World Summit on Sustainable Development (WSSD): SCP is identified as one of the three overarching priorities for the realisation of sustainable development in *Plan of Implementation of the World Summit on Sustainable Development*.

2002, September – WSSD also provides call for the development of a 10-Year Framework of Programmes on SCP and identifies the need for education initiatives to be part of policy.

2003, April-May – Meeting of UN Commission on Sustainable Development (CSD-11) initiates the Marrakech Process to produce a 10YFP, and includes the goals to:

*assist **countries** in their efforts to green their economies,*
*help **corporations** develop greener business models,*
*encourage **consumers** to adopt more sustainable lifestyles.*

2003, June – First International Meeting of Experts on Sustainable Consumption and Production at which the formation of seven task forces are initiated to further the Marrakech Process through policy initiatives, research activities and pilot projects. Connected to ESC are: “Education for Sustainable Consumption” (led by Italy) and “Sustainable Lifestyles” (led by Sweden).

2008 – ESC task force develops a set of guidelines *Here and Now, Education for Sustainable Consumption* (author: Thoresen).

In the Asia-Pacific Region:

1997 – The first annual Asia Pacific Roundtable on Sustainable Consumption and Production was held.

2005 – UNESCAP launches Green Growth policy initiative as a result of the fifth Ministerial Conference on Environment and Development in Asia and the Pacific.

2006 – UNEP/UNESCAP launch a regional help desk on SCP.

Source: Authors

2. Analytical approach

This chapter promotes the idea that governments are key stakeholders who can strongly influence consumer choice through ESC by using policy tools which:

- provide an understanding of the environmental imperatives;
- empower individuals to be actors in protecting the environment;
- explain the importance of sustainable consumption within this imperative; and
- develop a supportive social infrastructure for sustainable consumption practices.

The goals of this chapter are to identify good practices and outline a strategy for the effective implementation of ESC initiatives. These goals aim at supporting government plans for initiatives for ESC, but also recognise the consumer as one of the key actors in sustainable consumption. To identify mechanisms to influence consumer decision making, it is necessary to investigate issues concerning both individual/personal choice and social/political infrastructures.

There are three main parts of this chapter. First, the primary mechanisms for promoting sustainable consumption are examined and a framework of assessment is detailed. Second, practice cases on ESC from Japan, the Republic of Korea and China are presented and assessed. The implementation of specific ESC programmes are investigated in these case studies to identify good practices and gain further understanding of the important mechanisms in promoting sustainable consumption and encouraging the proactive participation of consumers. Third, policy implications from the case analyses are elaborated and an implementation strategy for consumer ESC initiatives is developed.

The analytical framework in this chapter is based on an interdisciplinary review of theories related to sustainable consumption and education prepared in the IGES policy report *Education for Sustainable Consumption in Northeast Asia* (Choi and Didham 2010). This approach includes a holistic view of the diverse factors that influence consumer behaviour, including social and cultural patterns, political instruments, and personal behavioural change strategies. The assessment of the case studies is done by an empirical-analytical methodology. This methodology develops from a post-positivist paradigm in order to delineate, compare and contrast these discrete variables (Connell 1997, 122). The research process was also supported by a snowball process, "a process of reference from one person to the next" (Denscombe 2003, 16), with a series of expert reviews of the analytical framework, the identification of assessment factors, and the selection of cases included in the original research schedule.

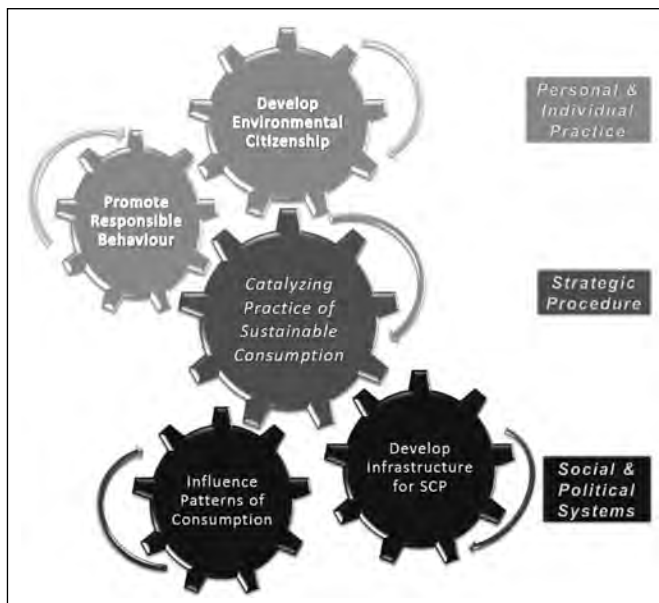
3. Identifying mechanisms for promoting sustainable consumption

An interdisciplinary investigation of the mechanisms that influence consumption practices and consumer behaviour was conducted in the above mentioned IGES policy report (Choi and Didham 2010) and provides the framework utilised in this chapter. Recognising the diverse factors that influence consumption practices, it was necessary to conduct a whole systems analysis that considers personal and individual practice in conjunction with social and political systems.

The broad understanding of education that is employed in this work considers formal, non-formal, and informal educational processes from a perspective of experiential education. As such, it considers direct information and knowledge that is provided to the individual, but it also addresses changes to social and political systems that encourage sustainable consumption. The development of a social infrastructure that presents better and easier possibilities for sustainable consumption can achieve important action learning outcomes. Consumer education for sustainable consumption that is being considered in this work attempts to address how to affect the individual consumer at the level of their decision-making on consumption and also how to develop a supportive social infrastructure that not only fosters sustainable consumption but eventually makes this the norm. ESC should promote responsible behaviour and engender environmental citizenship in respect to the practice of individual consumers. Regarding social and political systems, ESC should link with efforts to influence society's patterns of consumption and work towards a supportive infrastructure for SCP. Finally, there is a need to consider the overall strategic procedure that connects these mechanisms and systems in order to catalyse practice of sustainable consumption.

This chapter identifies five primary mechanisms for promoting sustainable consumption, as seen in Figure 3.1.

Figure 3.1 Primary mechanisms to promote sustainable consumption



Source: Authors

3.1 Framework of assessment

The basic outline of how ESC is understood and investigated in this chapter is shown through the identification of these five mechanisms to promote sustainable consumption. In order to evaluate the components of ESC initiatives, key factors were added to each primary mechanism based on a critical review of ESC literature and other assessment tools (See Table 3.1 for details.)

Table 3.1 Assessment framework of ESC mechanisms

A note on Table 3.1 can be found at the end of the chapter

1	<p>Catalyzing Practice of Sustainable Consumption <i>Procedural Steps for systematic development towards sustainable consumption</i></p> <p>Enable – remove barriers to sustainable consumption, develop supportive infrastructure, educate and give information about how to consume sustainably; Encourage – reward good behaviour, penalise bad behaviour, and enforce minimum standards; Engage – involve the public, communicate and campaign, utilise media resources, stimulate community action; Exemplify – lead by example, develop good practice and achieve a policy consistency; Catalyse – building from the other four points, make major shifts in social and cultural habits to engender a cultural paradigm grounded in sustainable practice.</p>	Strategic Procedure
2	<p>Promote Responsible Behaviour <i>Stages of Change in a decision-maker's consumption practices</i></p> <p>Precontemplation – the decision-maker is unaware of subject and information (<i>education and awareness raising is necessary to initialise contemplation</i>); Contemplation – the decision-maker begins to consider the subject, but does not link to action (<i>clear linkages must be drawn between the issue at hand and the individual's daily practices</i>); Decision/ Determination – conscious choice is made to take action and incorporate into daily practices (<i>practical examples to support action must be demonstrated</i>); Action – the decision-maker tests/experiences ways to incorporate new beliefs into practical behaviour (<i>new behaviour and action must be supported and rewarded</i>); Maintenance – the decision-maker continues with regular practice of this new behaviour and incorporates into practices of a wider community (<i>links should be drawn between new behaviour and wider socio-cultural changes</i>).</p>	Target: Personal and Individual Practice
3	<p>Develop Environmental Citizenship <i>Effective Value Promotion for consumers' proactive participation in sustainable consumption</i></p> <p>Pro-environmental values – a personal belief that protecting the environment is important; Individual Empowerment – that each person can be a powerful agent of change; Responsibility – a sense of environmental citizenship and duty; Simple actions – recognition that little steps can lead to big impacts; Future Vision – an inspired view of achieving a sustainable society.</p>	Target: Personal and Individual Practice
4	<p>Influence Patterns of Consumption <i>Efficient Tools and Instruments governments can utilise to encourage SCP</i></p> <p>Regulatory instruments – Used mainly to enforce minimum standards; Economic instruments – Negative taxing, positive subsidies and green procurement strategies; Educational instruments – Research/development, production training, public education, participatory learning methodologies, critical analysis techniques; Cooperative instruments – Improved production by technology transfer and voluntary agreements; Informational instruments – Consumer information: eco-labeling, auditing and reporting, environmental quality targets, consumer advice.</p>	Target: Social and Political Systems
5	<p>Develop Supportive Infrastructure for SCP <i>Preconditioning Factors of Consumption to consider in developing a supportive infrastructure</i></p> <p>Economic development – Secure access to sustainable purchasing choices, reduce product costs, improve productivity and strengthen sustainable livelihood opportunities; Technological progress – Reduce resource consumption, promote product efficiency and dematerialisation; Political settings & policy actions – Provide supportive political framework for transition to sustainable consumption and low-carbon lifestyles, also ensure policy consistency; Cultural & historical contexts – Respond to deep-set codes of conduct that frame knowledge and behaviour; Social factors and conditioning – Address social meaning and symbolic value of material possession; Psychological motives – Address personal understandings of happiness and quality of life.</p>	Target: Social and Political Systems

Of the five mechanisms, the first mechanism, Catalyzing Practice of Sustainable Consumption, is intended to employ **strategic procedures** to provide an overarching plan that can integrate the other four mechanisms. This mechanism needs to be both holistic and systematic in its approach to promoting sustainable consumption. In the work *Securing the Future (2005)* outlining the U.K. government's sustainable development strategy, a similar approach is presented for the government to affect consumer behaviour towards sustainable consumption. The U.K. government's approach is based on a five point strategy, which is adapted here for the first mechanism, Strategic Procedure, and can be seen in Table 3.1 (adapted from HM Government 2005, 24-41).

The second and third mechanisms target **personal and individual practices** by promoting responsible behaviour and developing environmental citizenship. The aim of the former, *promote responsible behaviour*, is to address how ESC can directly affect consumers' decision-making and behaviour. Although studying behavioural change and identification of driving factors are difficult, social marketing theory gives a perspective of the stages of behavioural change that a decision-maker experiences. The stages of change are borrowed from Andreasen (2002), and are the second mechanism seen in Table 3.1.

The other mechanism at the personal and individual level is *developing environmental citizenship*, an idealistic objective to strive for. Environmental citizenship, as a formative process, aims not only to educate an individual through transfer of knowledge, but to structure their values and practices to support sustainable development. In order for environmental citizenship to lead to responsible behaviour, it is important that the individual is informed, empowered and able to participate in decision-making processes. From the literature on responsible environmental behaviour and environmental citizenship, it is possible to identify five values that are central to the ideal of an environmental citizen.

By targeting **social and political systems**, governments can stimulate sustainable consumption through the fourth and fifth mechanisms. In the fourth mechanism, five policy tools for SCP are given which can be used to *influence patterns of consumption* (adapted from Tyson, ed. 2006).

The fifth mechanism, *develop infrastructure for sustainable consumption and production*, aims at normalising and making it easier to practice sustainable consumption by also targeting social and political systems. A UN-DESA (2009) report outlines six primary drivers (or, preconditioning factors) of consumption and how they can be reformed to achieve sustainable consumption (Table 3.1).

The five identified mechanisms and the aggregate criteria in Table 3.1 provide a core understanding of what an effective ESC campaign will address. However, it must be understood that ESC expands well beyond the traditional understanding of consumer education as mere information provision. This framework is being put forth both as a means of assessment on the effectiveness of a given ESC initiative and as an outline of what should be considered when preparing a new campaign for consumer ESC.

4. Assessment of policy and implementation: A study of cases in Northeast Asia

The three countries selected for case studies are the three highest consuming nations in Asia and the Pacific. Japan is the second highest world contributor to GDP (in nominal terms), China is third, and the Republic of Korea is fifteenth; together, these three

countries contribute 16.9% of global GDP (IMF 2009). These three countries have a significant opportunity to provide leadership in the Asia-Pacific region towards sustainable consumption. As the primary consuming nations in this region, they set the trends that will be followed throughout the region. If action is taken in these countries to secure sustainable consumption then it is likely these same patterns will be emulated throughout the region. Furthermore, as the primary producers of value-added items, these countries can encourage good practices in other Asian countries where raw materials are processed through corporate social responsibility from the parent companies in these three countries.

Japan, China and the Republic of Korea are all making considerable efforts to advance sustainable consumption and to educate consumers about the imperative for sustainable consumption and development. These efforts are relatively new in each of the three countries, and little analysis has been made on the influence these policies and actions have had. Green procurement is the most advanced activity by all three governments towards sustainable consumption, and has resulted in the growth of the green market in each of these countries. Work on education for sustainable consumption is increasing in these countries, and more campaigns are being aimed directly at consumers. However, difficulties still occur due to the lack of capacity and leadership for ESC in these countries.

4.1 Overview of case studies on ESC in Northeast Asia

This section looks at 11 cases on ESC in Northeast Asia: five cases from China, three from Japan, and three from the Republic of Korea (ROK). General details of these cases can be seen in Table 3.2, while more information on each of the cases may be found in Choi and Didham (2010). Five criteria were established for case selection as follows:

1. Source: Independent empirical ESC practice cases (reported not only in English but also in the selected countries' languages, i.e., Chinese, Japanese and Korean)
2. Geographical scope: Three selected countries in the Northeast Asia region (i.e., China, Japan and Republic of Korea)
3. Aims: To promote sustainable consumption by government cooperation/involvement
4. Target group: Consumers with purchasing power (over 18 years old)
5. Case running years: Ongoing project in 2009

These criteria were reviewed by experts in ESD from the three countries. The experts suggested a total of 23 cases for potential investigation. Cases that did not meet the selection criteria were eliminated, including cases that lacked existing primary evidence to satisfy the selection criteria.

Table 3.2 An outline of selected ESC practice cases

Case	Title	Aims	Target Group	Geographic Scope	Running Years
C1	Green Campus Project	To save energy and resources through environmental management	College and university students (18-25 years)	Nationwide	2003 to present
C2	Cool China	To encourage the nation to save energy and resources	Household, government and private sector	Nationwide	2006 to present
C3	Tackling White Pollution	To reduce use of plastic bags to save resources	Consumers	Nationwide	2008 to present
C4	Energy-Saving Project	To promote purchase of energy-saving products	Consumers	Nationwide	June 2009 to present
C5	Reduction from Beginning	To reduce food waste for sustainable consumption	General public	Shanghai only	Spring 2009 to present
J1	Eco-Action Points	To reduce household greenhouse gas emissions	Consumers	Nationwide	2008 to present
J2	Team Minus 6%	To encourage team or individuals to cut green emissions by 6%	Team leaders and individuals	Nationwide and international network-linked	2005 to present
J3	Green Purchasing Network	To provide information for consumer choice	Consumers	Nationwide	1996 to present
K1	Half Waste Double Recycling	To reduce waste for efficient resource management	Consumers	Nationwide	2005 to present
K2	Sustainable Consumption Campaign	To strengthen consumer choice and safety	Young people (13-19 years) and consumers	Nationwide	1997 to present
K3	Green Shop Movement	To support recycling campaign	Consumers	Nationwide	1992 to present

Note: C1: Chinese Case 1; J1: Japanese Case 1; K1: Korean Case 1

"Cool China" was reinstated in 2009 based on the "Temperature Setting Action" programme implemented across the country since 2006.

Source: Authors

These case studies are some of the first attempts to document the efforts being made on consumer ESC in Northeast Asia. The cases are examined in consideration of the five identified mechanisms and the aggregate criteria for assessment. From this study, it is possible to elaborate on the importance of these mechanisms in ESC practice and to highlight several examples of good practice. However, it is important to note two of the main limitations faced in this study. First, due to the limited number of available cases, it is not possible to declare sufficient statistical validity, thus it is difficult to provide generalised commentary for each individual country. Second, in studying ESC policy and

practice, there is difficulty in providing detailed assessment of the long-term effectiveness of such initiatives due to the length of time required for studying consumer behavioural change, which is beyond the scope of this chapter but certainly worth following up on as a stream of future research.

4.2 Main findings: Assessment of the mechanisms of ESC

The five primary mechanisms of ESC from our framework (see section 3.1) provide a core understanding of what an effective ESC strategy and policy should address. The selected cases of ESC practice were assessed on the level and depth to which they relate to each of the criteria of the primary mechanisms (Table 3.1). As a result, the five primary mechanisms of strategic ESC initiatives were reviewed and critical elements of procedure were identified, as follows.

Catalysing practice of sustainable consumption

Five procedural steps for systematic development towards sustainable consumption were assessed: Enable, Encourage, Engage, Exemplify and Catalyse. All of the procedural steps, with the exception of “catalyse,” are identified across ten of the eleven ESC cases. In all of the cases, the first four steps, enable, encourage, engage and exemplify, are identified with no significant deviation, with the exception of C3 (Tackling White Pollution) which strongly incorporates these procedural steps into practice, and C1 (Green Campus Project) which only weakly addresses two procedural steps. There is one Chinese case (C5: Reduction from Beginning) that reaches the procedural step “catalyse” in order to achieve social and cultural habit changes.

Promote responsible behaviour

Five stages of change in a decision-makers practice are considered: pre-contemplation, contemplation, decision/determination, action, and maintenance. Assessment of this mechanism resulted in three significant indications.

- All cases reached the third stage of decision/determination and encouraged individual's conscious choice.
- Eight of the cases incorporated the fourth stage (action) and engaged individual's proactive participation.
- Only five cases reached the final stage (maintenance). In general, it was difficult to clearly identify proven methods for maintaining the new beliefs achieved in the fourth stage. In particular, all three Japanese cases reached the final stage of maintenance, while this was indicated in none of Chinese cases. One case (K3: Green Shop Movement) has proven how the decision-makers incorporated their new belief into new action in the wider community and reached the final stage of maintenance.

Develop environmental citizenship

The literature review on ESC revealed that certain values play key roles in effective consumer education initiatives: pro-environmental values, individual empowerment, responsibility, simple actions, and future vision. The eleven cases were assessed for their promotion of these values and indicated the following:

- Pro-environmental values: This is a fundamental value underpinning development of individual empowerment in sustainable consumption and was identified in all eleven cases.

- Individual empowerment: This was identified in all eleven cases as a means to enable individuals to actualise their belief to contribute to sustainable consumption through diverse action.
- Responsibility: This was emphasised in five out of the eleven ESC practice cases with regard to citizenship participation in achieving a sustainable society together. Noticeably, only one case in China (C2) and one in ROK (K3) stressed the significance of this focal point in actual implementation, whilst it was applied in all three Japanese cases.
- Simple action: This was identified in five out of the eleven cases. In particular, Chinese cases strongly took simple actions to encourage people to take action in their daily life as shown in C2 (encouraging temperature limits for air conditioning/heating), C3 (reducing use of plastic bags) and C5 (packing unfinished food in restaurants). None of the Japanese cases incorporated this value.
- Future vision: This was notable in only four of the cases. All three Japanese cases developed and promoted a vision of a more sustainable society, as did K3. None of the Chinese cases clearly demonstrated a future vision, and thus missed an opportunity to orient engaged individuals towards a sustainable society and connect achievement in energy saving or resource management to this larger vision.

Influence patterns of consumption

Drawing on policy literature, five types of instruments were highlighted as a means for governments to influence patterns of consumption: regulatory, economic, educational, cooperative, and informational. Only one case K1 (Half Waste Double Recycling) utilised all five instruments in its practice, while another four cases applied four instruments. Six cases depended on a single instrument as the primary means employed, and three cases strongly employed two instruments.

Overall, informational policies are the most applied instrument (employed in ten cases and as a primary instrument in three). Regulatory instruments were used with the second greatest frequency. It is interesting to note that when regulatory instruments are used often, educational instruments are not used. Although educational instruments were employed in only six of the cases, they were used the most as primary instruments (a total of four times).

Develop infrastructure for SCP

Six factors serve as preconditioning drivers to consumption practices: economic development, technological progress, political settings and policy actions, cultural and historical contexts, social factors and conditioning, and psychological motives.

Four of the eleven cases (C3, C4, J3, and K1) demonstrated strong achievements in promoting transition across the social infrastructure factors. However, even these four cases missed the opportunity to work across all six factors. These four cases dealt strongly with economic, social and psychological factors. Overall, social factors were dealt with most frequently and in the most depth. On average between the eleven cases, each case dealt with 3.5 factors, however if the top four highlighted cases are removed then the average among the remaining seven drops significantly to 2.7 factors.

4.3 Results from the analysis of ESC practice cases

The empirical analysis completed in the previous section provides the opportunity to complete a quantified assessment of the practice cases in regards to their commitment

to each secondary category of the identified primary mechanisms. Table 3.3 summarises the performance rankings for each practice case in regards to the five mechanisms of strategic ESC. The top five cases in ranking are in order C3: Tackling White Pollution, tied for second K1: Half Waste Double Recycling and K3: Green Shop Movement, followed by J3: Green Purchasing Network, and C2: Cool China. The top three cases each achieved the highest score in two different mechanisms.

Table 3.3 Assessment of ESC mechanisms in practice cases

Mechanism Component	States/Elements	Chinese Cases					Japanese Cases			Korean Cases		
		C1	C2	C3	C4	C5	J1	J2	J3	K1	K2	K3
Catalyse Practice of Sustainable Consumption	Enable	+	+	++	+	+	++	+	+	+	+	+
	Encourage	-	++	++	++	+	+	+	+	+	+	+
	Engage	-	+	++	++	+	+	+	+	+	+	++
	Exemplify	+	+	++	+	+	+	+	+	++	+	++
	Catalyse	-	NC	-	-	++	NC	NC	NC	-	-	-
Promote Responsible Behaviour	Pre-contemplation	+	+	+	+	+	+	+	+	+	+	+
	Contemplation	+	+	+	+	+	+	+	+	+	+	+
	Decision/Determination	+	+	+	+	+	+	+	+	+	+	+
	Action	NC	+	+	+	+	+	+	+	NC	NC	++
	Maintenance	-	-	-	NC	NC	++	+	+	+	NC	++
Develop Environmental Citizenship	Pro-environmental values	+	+	+	+	+	+	+	+	+	+	+
	Individual empowerment	+	+	+	+	+	+	+	+	+	+	+
	Responsibility	-	+	-	-	-	+	+	+	-	-	++
	Simple actions	-	++	++	-	++	NC	NC	NC	++	NC	+
	Future vision	NC	-	-	-	-	+	+	+	NC	NC	+
Influence Patterns of Consumption	Regulatory instruments	-	++	++	-	-	-	NA	++	++	-	-
	Economic instruments	-	-	+	+	++	-	NA	++	+	-	+
	Educational instruments	+	+	-	-	-	+	++	-	+	+	++
	Cooperative instruments	+	+	+	-	++	-	+	+	-	+	+
	Informational instruments	-	++	++	+	+	+	++	+	++	++	+
Develop Infrastructure for SCP	Economic development	-	-	+	++	+	+	-	++	+	-	+
	Technological progress	NA	-	+	++	NA	+	NA	+	+	NA	-
	Political settings	NA	++	-	+	-	+	NA	++	++	++	-
	Cultural contexts	+	-	+	-	++	-	-	-	+	-	++
	Social factors	+	+	++	+	+	++	+	NC	++	+	+
	Psychological motives	-	-	++	++	+	+	++	NA	+	++	++

N.B.: ++ = Identified with proven achievements; + = Identified with a descriptive report only; - = Unidentified; NA = Not Applicable; NC = Not Clear.

Source: Authors

The aggregate criteria of the first mechanism, catalyzing practice of sustainable consumption, are generally well-incorporated into ESC implementation in all three countries. However, it was highlighted that the ability to drive the larger transition of social and cultural habits is not well understood, and the catalyse component deserves further research and elaboration of good practice. While the Chinese cases demonstrated strength in promoting simple actions, they also lacked the incorporation of responsibility and future vision. These aspects may indicate why the Chinese cases also were unable to secure the maintenance component of the second mechanism. In contrast, the Japanese cases did indicate a strong connection in incorporating both responsibility and future vision into practice and at the same time fulfilling maintenance of responsible behaviour.

Due to the limits of this empirical analysis, it is difficult to demonstrate any correlation between the various components of the five mechanisms. Future research could especially be focused on the various tools and instruments in the fourth mechanism, influence patterns of consumption, and their correlation with the components of the other mechanisms. For example, there is a slight indication that when regulatory instruments are the primary tool utilised it is difficult to engender the value of responsibility, which may be the situation in many of the Chinese cases. A closer look at this, as well as a fuller investigation into the linkage between improving educational instruments and influencing psychological motives may also be quite interesting and useful for elaborating more effective means to achieve ESC.

Looking further at the components of the fourth mechanism, informational instruments have been well developed across all of the cases. However when the cultural and social factors are unsupportive of the adoption of sustainable consumption, it is important to recognise that educational instruments play a more important role in enabling and encouraging a wider social and cultural transition than do mere informational instruments. When considering the expanded understanding of ESC as learning of advanced skills in systems thinking, critical analysis and participatory citizenship, it is very important to draw a clear distinction between the roles of these two instruments. Informational instruments have direct benefits at the point of consumption through the clear identification of sustainable consumption options. However, if we address the values being promoted in the third mechanism, develop environmental citizenship, it is important to begin to identify and model good practice on an educational framework that encourages action based on these values, supported at the point of consumption by informational instruments.

Finally, it is necessary to again draw attention to the fact that the last component—catalyse, maintenance, and future vision—in the first, second and third mechanisms, respectively, are not well addressed across the majority of the cases. This may provide an indication that there is an underlying relationship between the components catalyse, maintenance, and future vision. Establishing a long-term relationship with the consumer and the practice of sustainable consumption requires the fulfilment of these three factors. This is an area that deserves further investigation. In doing so, it may be beneficial to see how these components can be linked with the above investigation on “educational instruments” and “psychological motives.”

5. Recommendations and strategies for ESC

5.1 Implications on policy structure and context of Education for Sustainable Consumption

Key findings

Findings with significance across the eleven cases are related to the five primary mechanisms for promoting sustainable consumption. Conclusive findings on the relevance and importance of these five mechanisms can be drawn from across the case studies which provide specific implications for the general structure of ESC policies.

- 1) *Five primary mechanisms of ESC*: Develop environmental citizenship, promote responsible behaviour, catalyze practice of sustainable consumption, influence patterns of consumption and develop infrastructure for SCP are significant structural components in formulating an effective ESC policy.
- 2) *Motivational factors of personal and individual practice*: These factors are often underrepresented in the planning process of policy frameworks at the national level, but are essential to encourage individuals' voluntary participation and empowerment as personal changes in consumption practices appear rooted in meaningful and practical experience.
- 3) *Supportive social and political systems*: These provide the practical facilitation for sustainable consumption becoming the preferable and normal option of practice. However, to develop a supportive infrastructure for SCP, it is necessary to consider directly the preconditioning factors that drive current consumption practices. The analysis of efficient governmental tools and instruments for promoting sustainable consumption indicates a complexity of social and political systems which this research could not fully explore due to limited data and scope.
- 4) *Well-balanced contents of ESC policy*: The three targets of the identified ESC mechanisms personal and individual practice, social and political systems and strategic procedure can result in a synergistic effect for effective implementation of ESC policy. This appears especially true in developing supportive infrastructure for sustainable consumption as a vital tool for enabling people to maintain their proactive participation in daily life in a sustainable manner.
- 5) *Social and cultural contents of ESC policy*: This reflects local contexts regarding consumption patterns which are significant when considering how ESC can have specific national and local implications, especially for effecting change over a short period of time. Regarding prevalent values towards food and material possessions, traditional consumption habits are closely linked with socio-cultural contexts and factors and thus can remain as very resistant to change. ESC policies linking socio-cultural and psychological motivations with traditional habits are essential to address personal understandings of happiness and quality of life in order to develop a new value of material possessions. This, in turn, provides the stimulus for socio-cultural shifts towards a normalised vision of sustainable consumption.

Secondary significance for specific policy contents

There are several findings from the case studies regarding specific aggregate criteria in the assessment framework. These findings demonstrate at least a secondary significance because they are not represented across all cases. Thus, it is possible to highlight these as good practice areas of effective policies; however, to provide conclusive evidence on the level of significance of each policy measure identified below requires further research.

- 1) *Economic incentives*: The provision of financial savings/benefits for sustainable consumption is demonstrated as an easy way to engage consumers and promote action. It is possible to divide economic incentives into two categories based on amount of savings (small or large) and on regularity of consumption (frequent or seldom). Small savings in relation to frequent consumption actions appears to have more impact on social and cultural factors, than do large savings on irregular consumption actions.
- 2) *Regulation coupled with information provision*: When regulations are put in place to stop specific negative consumption behaviour, the utilisation of informational instruments is an important part of the effectiveness of this policy measure to help people understand the purpose of the regulations and encourage the maintenance of practice. That is, people's commitment to long-term practice of sustainable consumption can be catalysed when they gain more understanding through information provision as was shown in several cases.
- 3) *Correlation between maintenance and future vision*: Four of the five cases that achieved the maintenance criteria of the second mechanism also indicated achievements in future vision. In this context, future vision encourages individuals in that they can affect change towards an achievable positive future and sustainable society. The significance of this correlation deserves attention in future research as there may be a causal linkage between the promotion of future vision and consumer progress towards long-term maintenance of sustainable consumption.
- 4) *Visualising responsibility rationales for participation in sustainable consumption*: To facilitate more direct engagement of individuals, providing information about the clear consequences between their consumption choices and the wider environmental and social impacts of these practices appears to be vital. In particular, integrating a sense of responsibility with a sense of community seems to strengthen ESC projects' long term success, as demonstrated in the Korean case "Green Shop Movement."
- 5) *Missing linkage between simple actions and future vision*: Though both criteria are important factors in developing environmental citizenship, there appears to be difficulty in aligning these two values. When simple actions are promoted, it appears difficult to achieve future vision, and vice versa. Nevertheless, as shown in some Chinese cases, an ESC strategy of simple action seems to be very effective as the clear guidance facilitates people to practice with better understanding. Future research is therefore needed to address how best to reconcile this deficiency in current policy.

5.2 Five-point strategy to plan ESC

A strong consumer education strategy for sustainable consumption will need to be holistic and should utilise opportunities outside the scope of normal education activities. One of the main goals of this chapter is to develop a clear outline of the strategic actions required for preparing and implementing effective consumer education initiatives for sustainable consumption. The hope is that this strategy will provide the rigor to ensure effectiveness but also allow enough flexibility to apply in diverse circumstances. The purpose is to provide a step-by-step process for conceptualising and planning a campaign for consumer education on a chosen sustainable consumption topic.

This planning process is based on five primary steps: 1) establish vision, 2) check current situation, 3) build an action plan, 4) secure implementation, and 5) reflection. Each step incorporates multiple components and utilises the five sets of assessment criteria presented in Table 3.1 to provide a clear process of investigation and elaboration. Though there are five steps to the overall planning process (see Figure 3.2), the first step

serves as the initial visualisation of the project, the second and third steps are where the majority of effort and time is required for producing an action plan, and the fourth and fifth steps are part of the implementation stage. Within each step there are additional components and sub-steps.

Figure 3.2 Five-point strategy to plan Education for Sustainable Consumption



Source: Authors

The purpose of this strategy is to provide a basic outline of the holistic process that leads to the development of a consumer education campaign that will achieve success in advancing the proactive participation of individuals in sustainable consumption. This strategy can be applied across a range of topical issues, such as energy-saving or waste reduction. It can also be adapted to projects of different size, though naturally the larger the project, the more developed the plans will be, and thus, the more in-depth the various review and reflection processes will need to be.

Step one, establish vision, is the initialising stage of the process and provides the activities to ensure that an upcoming ESC campaign is well conceptualised. Within this step there are four action components. The first action, **visualise objectives**, requires detailing a conceptual map of what primary issues should be addressed in this project. It may be that the ESC campaign is a stand-alone activity unrelated to other activities, and this action is vital to establishing a clear starting point and focus. However, the planned ESC campaign may also link to a larger programme working across many sectors, in which case the main purpose is to identify how the ESC aspect of this overall programme will support consumer awareness raising and behaviour change. The second action, **identify clear subject of focus**, follows on from identifying a general topic to detail clearly the types of changes in consumer practice that are desired. The third action, **identify target audience**, is aimed at gaining an understanding of who exactly are the primary actors with influence in project. Traditional methods of stakeholder analysis will support this action. The fourth action, **set clear goals**, is the final part of establishing vision by identifying the areas where interventions and improvements are needed and detailing the outcomes and achievements the campaign should result in.

Step two, check current situation, is the stage of the process to investigate and assess the existing contexts and factors the campaign will have to account for. There are two action components within this step. The first action, **consider existing social infrastructure**, aims at identifying the preconditioning factors of current consumption patterns. This can be supported by mapping the primary drivers of consumption as outlined in mechanism five of Table 3.1. The second action, **consider the individual and prevailing value systems**, aims at directly understanding the personal values people hold that influence their consumption choices. This can be supported by investigating how close or far away the general population is to incorporating the values of environmental citizenship as highlighted in mechanism three of Table 3.1. The two actions of this step should provide a clear understanding of what the current situation is and where there are opportunities to influence change. In the overall project cycle, this step will likely account for between 10-20% of the entire length of time spent on the project.

Step three, build action plan, is the main stage of detailing the actions that will be incorporated in the consumer education campaign. The initial efforts in this stage are to identify areas to change in the existing systems. There are three action components within this step. The first action, **plan for behaviour change**, incorporates the stages of change in a decision-maker from mechanism two in Table 3.1 as a tool of investigation. It is important to reflect on the current situation elaborated in step two and consider where in this situation are there opportunities to influence consumer behaviour. The second action, **identify appropriate tools and instruments**, can utilise the efficient tools and instruments outlined in mechanism four of Table 3.1 as a form of review. The goal of this action is to consider the available opportunities for affecting change and to identify the appropriate instruments to apply at each of these opportunities. The third action, **compile clear plan of action**, builds on the points highlighted in the first two actions and tries to finalise a plan that is holistic and systematic. To support this action, the steps outlined in mechanism one of Table 3.1 can provide a structured procedural framework.

Step four, secure Implementation, includes the final efforts needed to ensure the proper functioning of the campaign, and is a review process to confirm that the action plan includes appropriate details for how project activities are to be completed. There are three actions included in this step. The first action, **prepare schedule of action**, is a practical calendar of when the various project activities will start and finish. The second action, **detail management of each action step**, should identify for each activity who will take responsibility, what should be completed/achieved and how it should be managed. The third action, **allocate appropriate resources**, must consider what type of resources (i.e., funding, manpower, media sources, etc.) will be needed and assure that they are appropriately secured throughout the project cycle. These three actions should result in an action plan with clear details on how each activity will occur, and at this point implementation of the consumer ESC campaign is well prepared.

Step five, reflection, is the final stage and is completed after the implementation of the campaign; however, its consideration during the early steps is often helpful, and some efforts to secure monitoring and evaluation directly into the action plan can be beneficial. There are three basic actions that should be included in the reflection step. The first action, **establish monitoring and evaluation (M&E) system**, is a crucial but complicated action. There are three items that can support the establishment of an M&E system: the criteria in the assessment framework of ESC mechanisms, the initial goals established for the campaign in step one, and the desired changes in patterns of consumption or consumer behaviour (This could include the five values of environmental citizenship.) The second action, **report on findings**, stresses the importance of reporting the findings and their implications in a clear and concise manner after M&E is conducted.

Finally, the third action, **adapt learning to future projects**, helps advance the practice of ESC and the implementation of future campaigns through lessons learned from this M&E process.

5.3 Considerations for future research

This chapter presents a framework for understanding and assessing ESC initiatives. The case analysis provides validation of the usefulness of this framework. However, to provide substantive conclusions on the long-term effectiveness of specific actions on the individual aggregate criteria of this framework, it would be necessary to conduct prolonged studies of consumer practice in light of specific policy measures since the overall goal of ESC is to effect changes in consumer behaviour.

For researchers: Future research would benefit from a series of case studies on ESC practice that incorporates surveys/studies of consumer behaviour prior to, during, and after the implementation of a given case. Research on the prolonged influence of ESC on consumer behaviour aimed at identifying good practice means that securing maintenance and catalysing shifts in socio-cultural habits would be particularly helpful. Finally, special consideration should be given to the importance of influencing social and cultural patterns of behaviour and creating impacts for paradigm change aimed sustainable practice in such research.

For policy decision-makers: As the limited case studies presented here help to extend a framework for assessing ESC, more in-depth research applying the identified aggregate criteria could help to strengthen the promotion of the strategy for planning ESC. Future research would benefit from a study of the various tools and instruments in the fifth mechanism and their correlation with the components of the other mechanisms. There is a limited indication that when regulatory instruments are the primary tool utilised it is difficult to engender the value of responsibility as may be the relationship in many of the Chinese cases. A fuller investigation into the linkage between improving educational instruments and influencing psychological motives would also prove beneficial.

Notes

1. Information from interviews with government officer in the Cabinet Office of Japan (Jul., Sep. and Nov. 2009).
2. Information from interviews with government officers in the Ministry of Environmental Protection, China (Jul. and Oct. 2009).
3. Information from interviews with government officer in the Presidential Committee on Green Growth, Korea (Jul. and Oct. 2009).

Notes on Table 3.1

1. Adapted from HM Government. 2005. *Securing the Future: Delivering UK sustainable development strategy*. DEFRA.
2. Adapted from Andreasen. 2002. "Marketing Social Marketing in Social Change Marketplace." *Journal of Public Policy and Marketing*; vol. 21 (1).
3. Values identified as key concepts in theories of responsible environmental behaviour and environmental citizenship
4. Adapted from Tyson, ed. 2006. *Policy Instruments for Resource Efficiency: Towards Sustainable Consumption and Production*. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ).
5. Adapted from UN-DESA. 2009. "Sustainable Lifestyles and Education for Sustainable Consumption." http://esa.un.org/marrakechprocess/pdf/Issues_Sus_Lifestyles.pdf

Source: Authors

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Chapter 4

Corporate Environmental Information
Disclosure: An innovative policy to
promote sustainable production

Chapter 4

Corporate Environmental Information Disclosure: An innovative policy to promote sustainable production

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1. Introduction

In developing Asia, many companies and business networks have engaged in sustainable production activities because they believe it will give them a competitive advantage, or because they see it as a core part of their business model. However, a large part of this group seems to take such action as a response to growing pressures or incentives from their related stakeholders, in particular investors and governments. In this region, pressure or incentives have been generated mainly from government agencies which have for many years been working to promote corporate sustainable production through traditional policies, such as command and control, and market-based instruments.

This chapter discusses the use of corporate environmental information disclosure (CEID) as a policy option to promote sustainable production in developing Asia.

The CEID approach refers to revealing information about the operational activities and environmental behaviour (products, production process, management procedures) of a company to consumers, investors, government officials, communities and the public at large. Informed stakeholders accordingly make sound decisions and their reactions are translated into incentives for good performers and pressure for poor ones.

Chapter Highlights

This chapter discusses corporate environmental information disclosure (CEID) as a policy option to promote SCP in developing Asia. Corporate environmental reporting and environmental performance rating programmes as CEID initiatives in the region are reviewed and discussed.

- CEID schemes in developing Asia hold promise for promoting environmental performance, but with considerable room for improvement. Accurate corporate environmental reports are scarce and environmental performance rating programmes seem to motivate significant environmental improvement more for companies with poor performance records.
- To promote sustainable production on a more significant scale, CEID policy should be recognised as a complementary policy as part of a policy mix including C&C and market based instruments, not as a standalone policy.
- CEID not only brings companies to compliance, but also helps identify the compliance level of other companies, which enables regulators to strategically select policy tools.
- Enforcement tools should be oriented to those companies which are below compliance, while market-based mechanisms should be oriented for those above compliance as incentives to make even further improvement.

Efforts should be taken in areas such as providing accurate information for stakeholders, empowering stakeholders to generate sufficient pressures/incentives, and encouraging companies to participate in this process, especially SMEs. Multi-stakeholder cooperation at national and multi-national levels is needed.

Thus, CEID has an advantage of enabling concerned social actors to act on corporate environmental management, and bringing them on board, together with government agencies, to generate pressure and incentives for companies to adjust their production activities. CEID also educates companies on their own performance and helps them to identify potential areas of environmental improvement. Investing in the provision of corporate environmental information as a vehicle to make the community and private sector active collaborators in the regulatory process has become a policy option that should be examined to see if it can promote sustainable production on a more significant scale in the region.

Command and control approaches have worked reasonably well for the control of large and highly visible sources of pollution (Anderson 2002). Over time, however, several scholars have pointed out that these regulatory approaches were excessively costly (Dasgupta, Laplante and Maminigi 2001; Tietenberg 1985). Market-based instruments, on the other hand, have added both flexibility and improved cost-effectiveness to emission control policy and also contributed to improved environmental performance (Vincent 1993; Arbelaez et al. 1998). Nevertheless, they have been introduced with varying degree of success (Hahn 1989; Tietenberg 1990).

In developing Asia, as elsewhere in the world, CEID is gradually gaining acceptance both at the company and government level. Indeed, many leading companies are voluntarily revealing information about their operational activities and environmental behaviour to the public at large in annual reports, environmental and safety reports, sustainability reports, and corporate social responsibility (CSR) reports. Some governments also are taking the initiative by driving or supporting programmes that reveal the rating of the environmental performance of companies such as the Program for Pollution Control, Evaluation and Rating (PROPER) of Indonesia, Eco Watch of Philippines, Green Watch of China and the Environmental Rating project in India.

To discuss the option of using CEID as a policy to promote sustainable production in developing Asia, this chapter reviews some of these voluntary and government supported CEID initiatives, and analyses the constraints to using this policy tool in a more effective way.

The remainder of the chapter is organised as follows: Section two reviews the determinant factors of corporate sustainable production which may show the necessity for adding CEID as a policy to promote corporate environmental management. Section three highlights the types of CEID and the channels through which it works. Section four sheds light on the current status of CEID in developing Asia by discussing some voluntary-based and government supported CEID initiatives. Section five analyses the constraints on using CEID as a strategy to promote corporate sustainable production. The last section is reserved for concluding remarks and a number of policy recommendations.

2. Determinant factors of corporate sustainable production

In developing Asia, as elsewhere in the world, companies are increasingly engaging in sustainable production activities and taking actions to benefit the environment and society. However, many companies are acting in response to growing pressures and incentives from their stakeholders. Gunningham, Kagan, and Thornton (2003) identified three types of pressures on a company: (i) economic or competitive pressure, (ii) regulatory pressure, and (iii) social or community pressure.

These external factors jointly shape to what extent companies choose to pollute or how often they choose to go beyond compliance. Howard-Grenville, Nash, and Coglianese (2008) added a fourth factor: internal factors or pressures. They argue that the internal attitude and characteristics of a facility, such as the perception and attitude of the manager, organisational identity and culture, and organisational structure, help explain how facilities perceive and deal with environmental problems.

A study conducted by Blanco et al. (2005) about the role of voluntary initiatives in sustainable production noted that the drivers for corporate voluntary initiatives have been very different throughout the Asia-Pacific region. In the industrialised economies, public environmental consciousness, consumer awareness and strength of non-government organisations (NGOs) are all clear drivers. However, in the less industrialised economies, the requirements set by the export markets represent a strong driver.

The econometric exercise in a Chinese case study conducted by Liu Xianbing and Venkatachalam Anbumozhi (2009) indicates a significantly positive effect of the overall level of environmental management of the industrial sector on the environmental management level of an individual company. Companies are likely to mimic the practices of leading companies in the same sector. According to the same study, the general public and industrial associations are not considered as the main driving mechanisms of proactive corporate environmental management in China. Another study conducted by Kansai Research Centre, Institute for Global Environmental Strategies (KRC/IGES) in 2008 on corporate environmental management in Thailand found that foreign and domestic market demands, and gaining a good reputation for the firm are among main driving factors for Thai companies to engage in proactive environmental management activities.

From this background, it is clear that besides government agencies, other stakeholders can also play a significant role in driving companies to take proactive actions and engage in sustainable production. However, their participation level and roles have been neglected in traditional environmental management policies such as command and control and market-based approaches, which focus on regulators as the only significant source of pressure and/ or incentives. Thus, a new multi-stakeholder approach, such as CEID, that links the companies, the government, the community, and the market should be examined to see how it can promote sustainable production to a greater extent (see Box 4.1).

CEID is used as a communicating tool for companies to connect with other actors. It is a reputational incentive that may generate a different pattern of responses than traditional approaches. Under a command and control approach, polluters in the same regulatory class are all required to meet the same standard regardless of cost. The result is generally convergence to the standard and great divergence in marginal cost of abatement across companies. Under market-based tools, polluters will tend toward abatement equivalent to marginal cost, but there will be great divergence in abatement practices. In a pure reputational incentive regime, polluters will abate to the point where the marginal cost of abatement is equal to the expected marginal gain in reputation value. Where reputation has no value, polluters may choose not to abate at all. However, polluters in sectors, communities or markets where reputation has a very high value may choose to abate more under reputational incentives than under either command and control or a market-based policy framework (Afsah et al. 1995).

Box 4.1 Green Prize winner urges Asia to name and shame polluters

Elisea Gillera Gozun, who leads seven environment non-government organisations (NGO) in the Philippines, winner of the 2007 annual Champions of the Earth award, said in an interview with Reuters:

“Asia's environmentally unfriendly firms should be named and shamed into cleaning up their acts, as this is more effective than government regulation in promoting green issues... We react more to that rather than the fear of regulation... Bureaucracy often gets in the way of enforcing environmental standards and many firms do not take threats of closure very seriously... government regulation is not a real threat, and it's not something that firms fear.”

Elisea Gillera Gozun cited an example of a textile firm in Manila which had discharged untreated water into the city's Malabon-Navotas river in the 1990s, and was shamed into cleaning up the effluent after the government named it as one of the "dirty dozen" responsible for polluting the river.

“The children of the family that owned the textile firm were so ashamed by this that they refused to go to school... They said 'We are so embarrassed because now our classmates are saying we are rich, we are making money, but we are polluting the river'... That's what woke the family up. They cleaned up their act, and now serve as a leader in the community.”

Source: Article is available at: http://www.javno.com/en-economy/green-prize-winner-urges-asia-to-shame-polluters_36261 (Last accessed 17 December 2009)

3. CEID as a strategy to promote corporate sustainable production**3.1 Definition and types of CEID**

CEID refers to the dissemination of information relating to the operational activities and environmental behaviour of companies (products, production process, and management procedures) to their related stakeholders and the public at large. Depending on the way information is conveyed, CEID can be classified into three types.

- Type 1: Certification of products, processes or management procedures by independent agencies: Examples include eco-labelling and green labelling certification, which are oriented towards products, and International Organization for Standardization (ISO14001) certification and Eco-Management and Audit Scheme (EMAS), which are oriented toward an environmental management system.
- Type 2: Self-certification, without fixed criteria or independent outside review: For example, many companies evaluate their environmental performance according to several criteria and their own internal goals, and are disseminating their results in annual environmental reports, such as CSR reports.
- Type 3: Provision of raw data, without interpretation or judgement, sometimes in the form of life cycle analysis: Examples include the Toxic Release Inventory (TRI) programme implemented in the U.S., and the Pollutant Release and Transfer Register (PRTR) programme implemented in Japan.

Environmental performance rating programmes such as PROPER in Indonesia, Green Watch in China, and a green rating project in India, have traits of both type 1 and type

3. The information is interpreted through ratings and refers to firms or plants rather than products, and the rating is carried out by a government or NGO (Lopez et al. 2004). Regardless of the type, all CEID programmes have the same functional mechanism to influence corporate environmental behaviour.

3.2 Functional mechanisms of CEID

Tietenberg (1995) identified seven channels through which CEID may motivate improved corporate environmental performances. To simplify the exposition in this chapter, these channels are grouped into five broader categories.

- Output market pressures such as pressure generated by individual or group purchasers;
- Input market pressures such as the pressure generated by investors who provide capital as financial inputs;
- Formal regulatory pressures generated by government institutional regulation;
- Informal regulatory pressure generated by communities, industry associations, NGOs, legislation, media, etc.;
- Firm's internal pressures generated by managers, employees, etc.

Output market channel

Giving clear, straightforward information on the environmental performance of a company or about the environmental effects and qualities of its products, and how to use and dispose of them helps consumers to make informed buying choices. For example, eco-labelling certification is one of many ways to provide product information on environmental performance and has the added advantage of having the information affixed to the products. Forest certification, discussed in chapter 8 of this White Paper, is an example of eco-labelling that identifies products with wood materials sourced from forests managed according to a set of minimum sustainability standards. Carbon labelling is other example of a new initiative to communicate with consumers how much a product contributes to the reduction of greenhouse gases (see Box 4.2). Some organisations, such as GoodGuide,¹ are also committed to providing information on the health, environmental, and social impacts of products and companies that people need to make better decisions. Through the GoodGuide website, users can search for information on over 70,000 food products, toys, personal care and household products. They can also create their own lists of favourite products, or products to avoid, and then publish these lists on a blog or website.

The environmental awareness of some consumers has reached a critical level, where their purchasing behaviour has become sensitive to the environmental characteristics of the products and services they purchase. Thus, CEID could either reduce or enhance their demand for a company's output, depending on whether the company is practicing relatively sustainably or unsustainably. Depending on the environmental preference of consumers, market demand can be adversely affected by a negative reputation. Boycotting environmentally damaging products or products of poor environmentally performing companies represents a pressure on these companies to change their production behaviour. This output market pressure is amplified when environmental considerations form a part of the consumption decisions of large-volume purchasers, such as government offices (e.g., public timber procurement policies discussed in chapter 8) or big chain stores.

Box 4.2 Thai “Carbon reduction label” to enhance consumer decisions to help offset CO₂ emissions

Thai Carbon Reduction Label



Thailand Greenhouse Gas Management Organization (TGO) is a public organisation working in cooperation with Thailand Environment Institute (TEI) to establish a “Carbon Reduction Label” scheme. This provides a measure, expressed as “carbon dioxide equivalent,” of how much a product contributes to the reduction of greenhouse gas emissions across its life cycle. Such a label has been in use in many countries, for example, France, the UK, Sweden, the U.S. and Japan. With the Carbon Reduction Label, TGO foresees the opportunity to motivate producers to emit less greenhouse gases by using more efficient processes which will meet consumers’ choices. This new system is planned to enable consumers to identify goods manufactured with a minimal release of greenhouse gases into the atmosphere.

Sirithan Pairojboriboon, director of TGO, views this system as a way to allow Thai consumers to directly participate in environmental management and influence production behaviour. He expects “more producers of consumer goods to apply for the labels so that they could be seen as promoting an image of environmental protection.” He also anticipates that “products carrying the carbon labels will enjoy greater export sales, since the European Union has geared up for the enforcement of new environmental regulations requiring imported products to have a carbon label.”

The Carbon Reduction Label has drawn attention from members of the Thai industrial sector. As of 27 March 2009, 34 producers have applied to register their products. Currently 25 products from nine product categories are registered. They include dried food, cement, artificial wood, rice bags, condoms, floor tiles, ceramic tiles, cooking oil, and milk cartons.

Sources: <http://www.bangkokpost.com/life/family/14194/carbon-reduction-labels-arrive> (Accessed 4 December 2009); http://www.bangkokpost.com/190808_News/19Aug2008_news12.php (Accessed 2 December 2009)

Input market channel

In the capital market, CEID schemes provide an important channel to inform investors and financial institutions about the environmental performance of companies. Socially Responsible Investors (SRI) with strong environmental preferences and financial institutions are looking to responsibly invest their resources. The ranks of these SRIs are growing through developed and developing countries and many organisations are dedicated to promoting their practices. Social Investment Forum² in the U.S., the European Sustainable Investment Forum (EuroSIF)³ in the E.U., and the Associate for Sustainable and Responsible Investment in Asia (AsRIA)⁴ are examples of organisations

that provide insightful, up-to-date, and accessible information on the development of SRI, and are the platform for different sectors within the community to exchange information and perspectives on SRI, and to take good practices forward. In this regard, the United Nations Environment Programme (UNEP) launched its Principles for Responsible Investment⁵ that provide a framework to help investors incorporate environmental, social, and governance (ESG) factors into the investment process. Furthermore, the Equator Principles Financial Institutions (EPFI) have adopted the "Equator Principles"⁶ as a financial industry benchmark for determining, assessing and managing social and environmental risks in project financing. SRIs screen companies for high standards in environmental performance as they develop their investment strategy. Available information about the environmental performance of a company can attract attention or cause investors to shift away from potential investment. Poor environmentally performing companies will find it difficult to attract these SRIs and/or raise funds unless they improve their environmental performance (Box 4.3).

Box 4.3 Involvement of stakeholders in the input market to promote green credits

In India, financial institutions are increasingly promoting green credit. In this regard, many financial and insurance firms are beginning to insist on comprehensive environmental audits to limit the environmental risk in their project financing. Many other financial institutions have created special departments to examine the environmental implications of their lending policies.

In China, on 12 July 2007, the State Environmental Protection Administration (SEPA),⁷ the People's Bank of China and the China Banking Regulatory Commission (CBRC) jointly issued a policy called "Notes on Reducing Loan Risk by Enforcing Environmental Protection Policies and Regulations," promoting a green credit policy to all enterprises in the country. Soon after that, the Notice on the Prevention and Control of Loan Risk from High Pollution and Energy Consumption Enterprises was released by CBRC. Moreover, some commercial banks also declared their own requirements with regard to green credit. For example, the Industrial and Commercial Bank of China proposed the establishment of a one-vote veto system: once an enterprise does not comply with environmental policy, it may not receive loans. Enterprises' environmental compliance is now considered a prerequisite to obtain loans. Enterprises that implement better environmental protection policies may receive preferential financial support from the banking sector.

Source: IGES 2008

Formal regulatory channel

Formal regulators need environmental information to set regulations and design market-based instruments. They attempt to collect information through Environmental Impact Assessment (EIA) programmes, environmental monitoring plans, real time monitoring systems, and remote sensing. The information gathered allows authorities to set priorities and eventually make more informed choices on policy instruments. It is in this sense that CEID is a prerequisite for regulation, as some poor performing companies have clear incentives to withhold some kinds of information. In the absence or lack of needed information, regulators adopt stricter performance standards on all companies independently of their environmental performance level, and/or use inappropriate market-based instruments which can be both costly and time consuming. However, in several cases, CEID has provided competitive incentives for superior performers to identify

themselves, hence helping the regulators identify poor performers. In this case, the limited inspection and enforcement budget of environmental agencies can be applied towards poor performers, thereby increasing the expected cost of non-compliance through the increased probability of inspection and enforcement.

Informal regulatory channel

In many cases, communities, NGOs, and respected civil society organisations are well aware of environmental risks but may not have adequate information to identify the precise pollution sources, pollutants, their health effects or levels of exposure. In such situations, CEID will fill the gap and may catalyse their action. With the appropriate information at hand, the general public, local communities and NGOs can impose costs on firms by mobilising people in their economic roles—as consumers, investors and workers, to take personal and collective actions against badly performing companies.

They can also call for and execute boycotts or use environmental class action suits as a means of influencing the environmental performance of companies. Furthermore, they can provide political support to environmental authorities to force powerful companies to comply with environmental standards and to initiate action against those causing environmental damages (Box 4.4). With the current limited capacity of the government to inspect enterprises, complaints from local communities will help agencies to prioritise the inspections.

Box 4.4 Empowered informal regulators' actions against polluting companies

Local community concerns have played a major role in bringing truant industries in line. With more than 10,000 special interest groups in the environmental and developmental sector, India's increasingly strident green movement has caused several facility relocations and closures. These include relocation of a \$176 million nylon manufacturing joint venture of DuPont and a local company from Goa, and the abandonment of a \$714 million integrated steel project, and closure of a Coca-Cola bottling plant in southern India, among several others.

NGOs also act as whistle blowers and watch dogs in initiating actions against organisations and individuals causing environmental damage and participate in policy making and gathering opinions from the public.

Increasing awareness has led citizens to approach courts to settle environmental disputes. Indian courts have been looking more sympathetically at these cases and have from time to time passed directions and judgments to reduce environmental damages. In one instance, India's Supreme Court served closure notices to over 9,000 polluting industrial units in the capital city of Delhi and ordered their relocation. In another judgment, the Court ordered the immediate closure of 59 industries located in the southern state of Tamil Nadu, for not installing the required effluent treatment plants. In the western state of Gujarat, the High Court threatened over 250 chemical units with closure for discharging toxic effluents into a nearby river, while about 232 units were placed on a watch list.

Source: IGES 2008

Firm's internal channel

CEID is beneficial to companies as well. It may provide new information to top managers about their company's performance, and options for improving it. CEID also works through internal benchmarking because it requires data collection and reporting in standardised formats on a regular basis. Because diverse groups scrutinise the environmental data, public disclosure strengthens the culture of environmental data collection in addition to disciplining the system of environmental data collection within an organisation.

Consequently, it becomes possible for a company to observe the rates of environmental improvement relative to its historical baseline and undertake appropriate measures for continual improvement. As information on environmental performance of companies becomes publicly available, comparative analysis and environmental benchmarking are feasible. Since companies compete with their public image and reputation, CEID creates dynamic incentives for environmental improvement. Blackman et al. (2004) surveyed managers of companies participating in an environmental rating programme in Indonesia, and found that the determinant means by which the programme spurs abatement was by improving managerial information.

4. CEID initiatives in developing Asia

In developing Asia, CEID schemes are gradually gaining acceptance at company and government levels. Many companies are using corporate environmental reports to communicate details about their environmental performance with their related stakeholders, whereas governments are establishing or supporting environmental performance rating programmes, such as in the Indonesian, Chinese, and Indian cases described below. Both schemes provide information on the environmental performance of an entire company, not only on one product, and are discussed below.

4.1 Corporate environmental reports

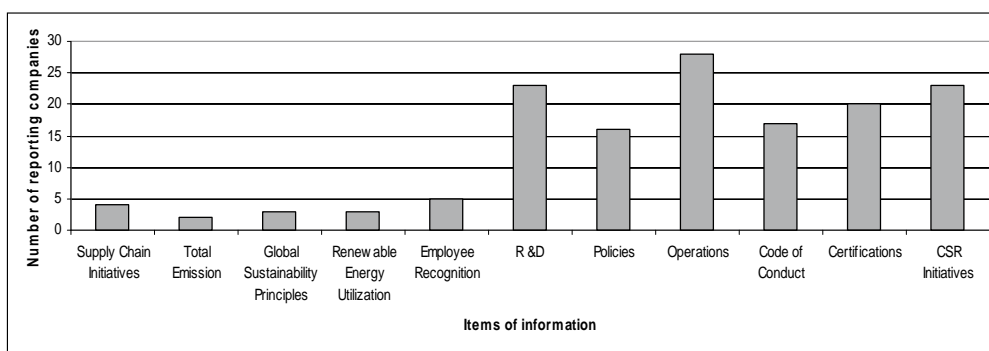
Corporate environmental reports (CER) are publicly available, stand-alone reports issued voluntarily by companies on their environmental activities. Factors driving companies to publish such reports vary across companies and across countries. While companies in Hong Kong identified attracting Socially Responsible Investors (SRI) as the main factor for corporate environmental reporting, companies in Malaysia also cited meeting the demand for transparency and accountability as a main factor (Environmental and Social Development Department East Asia and Pacific Region, World Bank 2006). In China, social factors were recognised as the main factors followed by market, political and regulatory factors, respectively (Liu 2009).

On the positive side, evidence shows that some CERs have helped reduce emissions, increase company eco-efficiency, or boost competitiveness (Arimura, Hibiki, and Katayama 2007). They also helped companies avoid more costly regulation and saved governments some regulatory expenses (Schmidheiny, Chase, and De Simone 1997), but in practice, they have several weaknesses that are obstacles in the drive for better environmental performance on a significant scale in developing Asia.

For example, it is difficult to compare the environmental performance of different companies, or to track their performances over time based only on their CERs because these reports are not standardised, and report different types of data. Some reports

simply state the environmental commitment of a company and its goals for improvement without significant data, interpretation, or clearly specified steps being taken. Others offer a wealth of data, but it is often focused on product safety, hazardous waste or other compliance information taken from mandatory reports to the government rather than environmental performance variables that would give a fuller picture of the company (Utting 2002). Figure 4.1 shows some of the environmental information items reported by 30 selected Indian companies from different sectors (20 in chemical industry, six in automobiles and four in food and beverage) in their CERs. It shows how companies are more willing to disclose subjective environmental information such as the company's own policies, spending on research and development, certifications obtained, and CSR activities, but that they are reluctant to share information on actual performance, such as pollutant emissions, renewable energy utilisation, and global sustainability principles.

Figure 4.1 Sample of the information reported by selected Indian companies in their environmental reports of 2007



Source: Figure produced by authors based on data from IGES 2008.

Furthermore, CERs do not guarantee that companies really have good environmental records. For example, Unilever received an award from the Association of Chartered Certified Accountants (ACCA) for its environmental reporting despite the fact the company did not mention a mercury poisoning accident in India that occurred in the same year (Doane 2005).

With the emergence of the Global Reporting Initiative (GRI) guidelines and other NGO oriented initiatives like the Carbon Disclosure Project, companies are under pressure to provide verifiable, accurate quantitative data about the size of their social, economic and environmental imprint. These guidelines outline the core content for consistent reporting and are relevant to all organisations regardless of size, sector, or location, which make it possible to compare the environmental performances between companies, and to track their performance over time. However, in developing Asia, the number of companies participating in these initiatives is still very limited. They are mainly large firms or subsidiaries of multinational companies. Table 4.1 shows the number of participating companies in GRI in selected Asian countries and the rest of the world. Although the number of participating Asian companies in GRI has increased over time, the number is still small and accounts for only 15.4% of the total number of participating companies around the world.

Table 4.1 Trend of companies participating in GRI in selected Asian countries and the rest of the world

	Origin of companies participating in GRI initiative					
	China	India	Japan	South Korea	Asia	All countries
1999	0	0	1	0	1	10
2000	0	0	7	0	7	45
2001	1	1	23	0	26	123
2002	4	4	17	0	27	140
2003	1	1	14	2	20	175
2004	3	5	20	4	33	290
2005	4	3	20	7	38	379
2006	5	6	18	14	51	519
2007	8	8	23	29	84	699
2008	15	20	51	40	163	1059

Source: Table produced by authors based on data from GRI website <http://www.globalreporting.org/GRIReports/GRIReportsList/>⁸

4.2 Environmental performance rating and disclosure programmes

Since the Rio conference in 1992, environmental performance rating and public disclosure schemes have been established in several countries of developing Asia. These include the Program for Pollution Control, Evaluation, and Rating (PROPER) of Indonesia, Eco Watch of Philippines, Green Watch of China, and Environmental Rating Project in India, among others. They are similar government driven or government supported programmes allowing the government to set up an environmental grading system to categorise the environmental performance of companies by checking their degree of compliance with environmental regulations. First, selected companies are rated from best to worst using different colours depending on their compliance to regulatory standards, and then this rating is publicly disclosed. The underlying idea is that shame may be a strong motivator for companies to improve their environmental performance.

To shed light on the effectiveness and function of environmental performance ratings in developing Asia, rating programmes implemented in Indonesia, China, and India are discussed below.

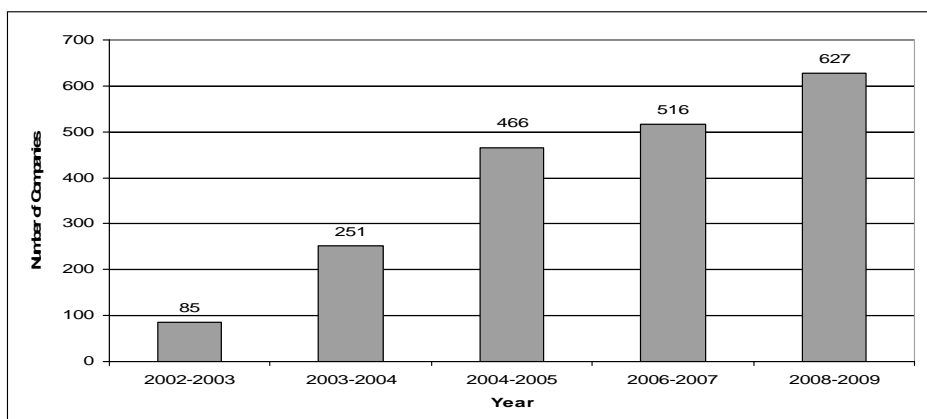
PROPER in Indonesia

In June 1995, Environmental Protection Agency in Indonesia (BAPEDAL)⁹ launched PROPER, where information was interpreted through each company's performance rating in wastewater treatment compliance. Companies were ranked in a colour-coding scheme that was easy for the public to understand (gold and green for the best performers beyond compliance, blue for basic compliant firms, black and red for those not in compliance with wastewater standards).

The ranking information was released to the public at a formal press conference and posted on the internet; good performers were praised publicly and poor performers were given time to clean up before public disclosure. In addition, for each participating company, Indonesia's environmental agency issued a one-page report on environmental performance, which served as an information resource for the company's managers and environmental engineers.

PROPER is widely recognised as a successful, cost-effective programme for reducing pollution, with reductions of over 40% in a trial group of 187 companies between December 1995 and July 1997, and increasing overall performance by around 34% (World Bank 2006). The total estimated reductions in pollution concentration for 44 noncompliant firms (40% of the noncompliant firms that were rated in the programme) were approximately 32% for biochemical oxygen demand (BOD) and chemical oxygen demand (COD) (Lopez et al. 2004). However, due to the financial crisis in Indonesia, PROPER fell into “hibernation” in 1998. It was restarted in 2002, with company participation increasing from 85 in 2002-2003 to 627 in 2008-2009 (Figure 4.2), and the focus extended to compliance with air emissions and hazardous waste controls, not only wastewater compliance. The new colour coding format included two new categories, and companies are rated from best to worst as follows: gold, green, blue, blue minus, red, red minus, and black.

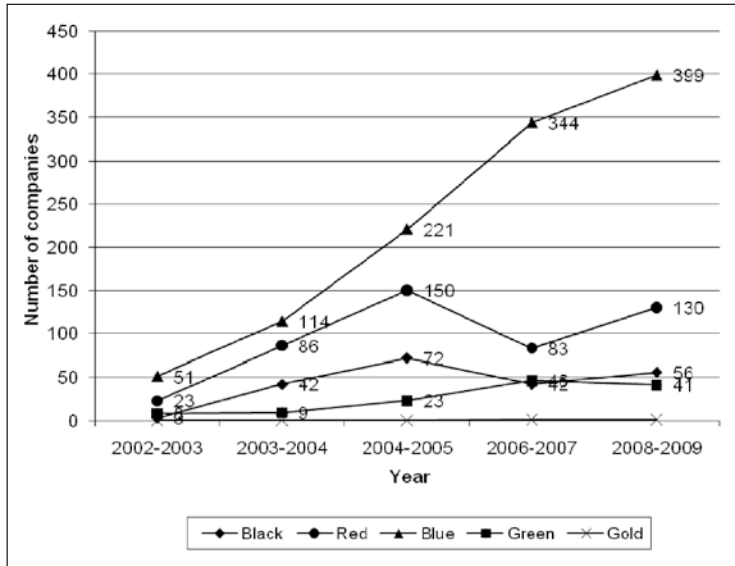
Figure 4.2 Increase in the number of companies participating in PROPER from 2002-2009



Source: PROPER 2008-2009 report

The increase of participating companies over time demonstrates how seriously the companies perceived PROPER ratings; interestingly, the programme seems to motivate more significant emissions reductions for plants with poorer performance records, but not among those with better performance. This was the case for the programme between 1995 and 1998 (Blackman et al. 2004), and also after 2002 as depicted in Figure 4.3. While the number of companies rated blue (blue and blue minus) has increased from 51 in 2002-2003 to 399 in 2008-2009, only one company was rated gold in 2008.

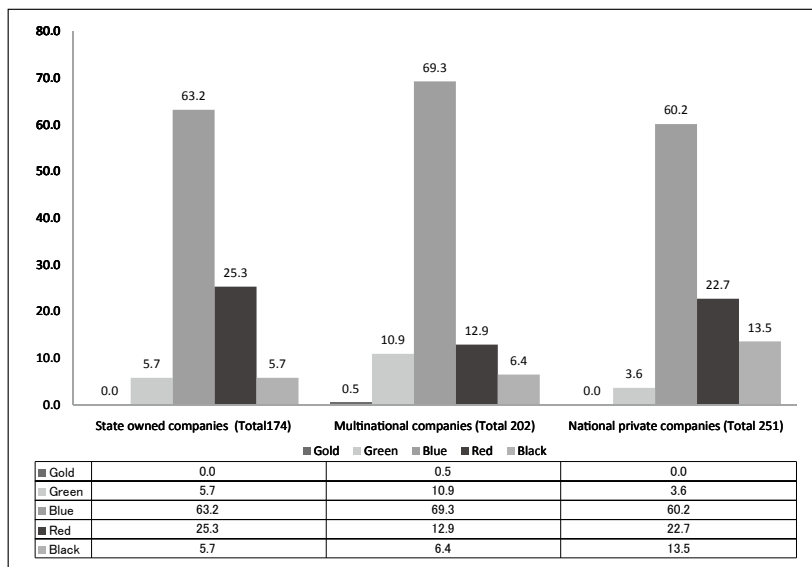
Figure 4.3 Number and rating change of companies covered by PROPER from 2002-2009



Source: PROPER 2008-2009 report

Furthermore, although there have been solid increases in the compliance levels of all types of companies, there is a remarkable performance improvement difference between companies with different ownership (state owned companies, multinational companies, or domestic private companies), as well as differences across industrial sectors (such as sugar, paper, plywood, textile, and rubber). In terms of ownership, multinationals proved to be better performers (Figure 4.4), possibly due to greater reputational risk.

Figure 4.4 PROPER rating of companies in 2009 by ownership



Source: PROPER 2008-2009 report

The existing literature on public disclosure and related topics has focused on the sources of pressure to improve environmental performance that are external to the firms. However, a study carried by Blackman et al. (2004) about PROPER functioning between 1995-1998 showed that the most important means by which PROPER encouraged emissions reductions is enhancing company owners' and managers' information about their own company's emissions and abatement opportunities—the environmental audit effect.

The majority (60%) of the respondents to the survey indicated that the critical means by which PROPER ratings spur improved performance is providing information to plant managers and owners about their own plant's emissions and abatement opportunities via the one-page performance reports issued by Indonesia's environmental agency.

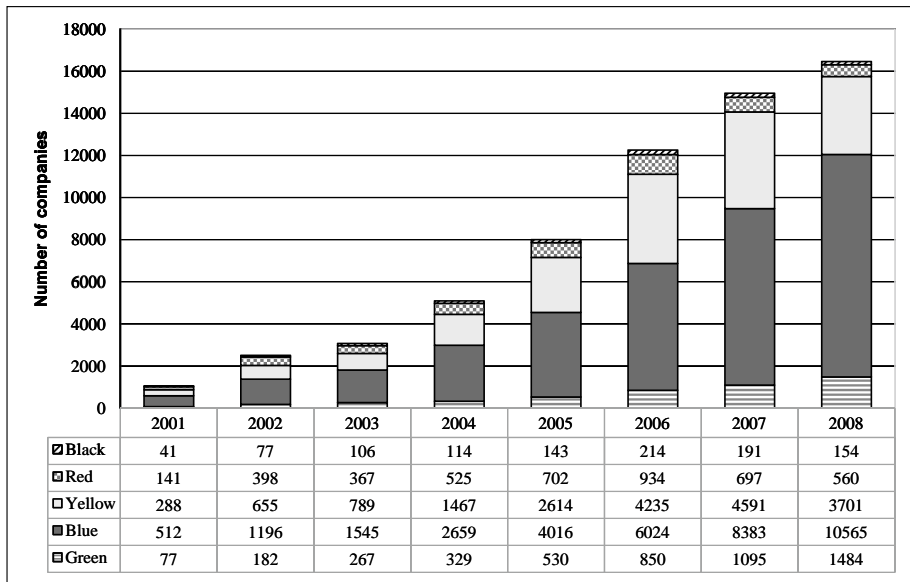
This is not to say that the survey respondents did not perceive factors external to the firm to be important. Some 36% of the respondents viewed that bad PROPER ratings increased pressure from communities living around the factories, and around a quarter of the respondents viewed the PROPER rating as resulting in increased pressure from the media.

Green Watch in China

In response to the success of performance rating programmes in Indonesia, China implemented a similar programme called "Green Watch," where the environmental performance of firms is rated from best to worst using five colours (green, blue, yellow, red and black), and the ratings are disseminated to the public through the media. Supported by the World Bank's Information for Development Program,¹⁰ the State Environmental Protection Administration (SEPA)¹¹ of China started a pilot programme in 1998 in Zhenjiang and Hohhot in 2000. As a result of its success, SEPA decided to promote it nationwide.

Similar to PROPER, the outcomes of the Green Watch programme suggest that it motivates more significant emissions reductions for plants with poor performance records, compared to those with good performances. An example is the environmental performance rating programme being implemented in Jiangsu province indicated in Figure 4.5. The total number of participating companies increased from 1,069 in 2001 to 16,464 in 2008. Encouragingly, the ratio of companies with bad performance records (rated red or black) decreased from 17.18% to 4.33% during the same period. However, the ratio of companies with very good performance records (rated green) only showed a slight increase from 7.27% to 9.01%. This demonstrates that Chinese companies worry about bad ratings and try to comply with the basic requirements on pollution control.

The functioning of this disclosure programme was qualitatively assessed in a study conducted by Liu et al. (2009) from 2005 to 2007. In the study, 32 firms located in Changshu City (25 in the dyeing and textile industry, seven in the chemical industry) were interviewed. Participating firms carried out a self-evaluation of their environmental performance and concluded that their general performance improved during the study period.

Figure 4.5 Number and rating change of companies participating in Green Watch from 2001-2008

Source: Figure produced by authors based on data from Jiangsu Province Environmental Protection Bureau (JSEPB) (<http://www.jshb.gov.cn>)¹²

On average, the disclosure programme has significantly contributed to the improvement of environmental performance in many aspects. Reduction of pollutant emissions to meet concentration standards and permitted total emission load is the most prominent evidence of progress. The participating firms confirmed that the programme encouraged them to enhance daily environmental maintenance, such as maintaining effluent outlets and strengthening institutional arrangement for environmental management.

The same study found that complying with environmental regulations is still a determining factor in influencing a company's environmental performance. Chinese companies are mainly reactive to the mandatory environmental requirements.

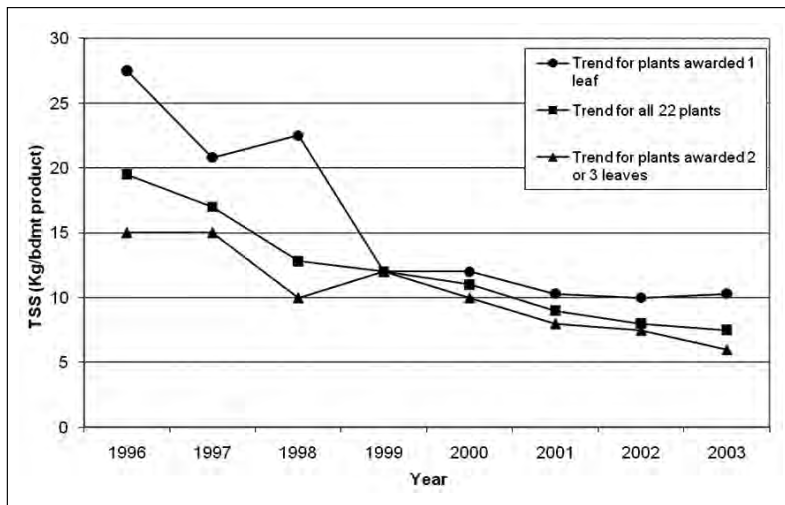
Green Rating Project in India

In the late 1990's, the Centre for Science and Environment (CSE), an NGO in India, initiated a performance rating programme called "Green Rating Project" (GRP). The programme is an effort to rate industrial units within a specific sector on the basis of their environmental impact. It aims to encourage companies to adopt better environment management policies. GRP ratings are not based on colours; rather, it is based on the number of tree leaves. The award is given by CSE in recognition of the rating achieved by industries on the basis of their environmental performance in various sectors covered under the GRP. Rating scores range from five leaves, the highest rating, to one leaf, the lowest.

GRP has been able to motivate companies, particularly plants that received one leaf, to improve their environmental performances significantly. Nicholas et al. (2008) used eight years of exceptionally detailed survey data on 22 of India's largest pulp and paper plants and found that, as depicted in Figures 4.6 and 4.7, there is a large decrease of both

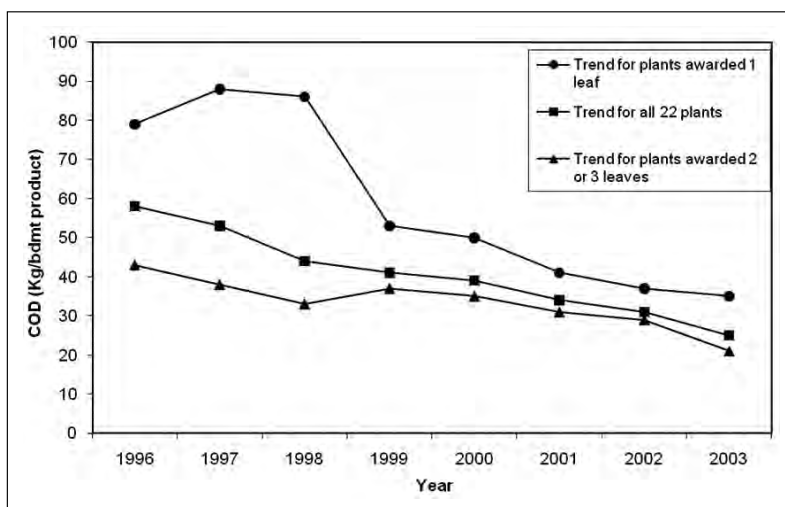
the annual average discharge of total suspended solids (TSS), and the annual average discharge of chemical oxygen demand (COD) from the total 22 selected plants participating in GRP. Among these, the decrease is greater for plants awarded one leaf than for plants awarded two or three leaves. Nicholas et al. (2008) found that with GRP disclosure, a company's COD discharges decreased by 63% between 1996 and 2003 compared to a decrease by 54% in a company not participating in GRP. The effect of the disclosure programme is even stronger regarding TSS, where a plant's emissions would decrease 65% with the disclosure programme but only 46% for non-participating companies.

Figure 4.6 Trend of the annual average discharge of TSS from selected pulp and paper plants participating in India's GRP



Source: Nicholas et al. 2008

Figure 4.7 Trend of the annual average discharge of COD from selected pulp and paper plants participating in India's GRP



Source: Nicholas et al. 2008

The GRP has also motivated companies to improve their environmental performance independently by sector, such as pulp and paper, chemicals and automobiles. Achievements are summarised in Table 4.2.

Table 4.2 Major impact of the rating process in three industries

Industrial Sector	Before GRP	After GRP
Pulp and Paper	Less than 10% of companies substituted chlorine with chlorine dioxide (an environment friendly substitute).	Around 90% companies substituted chlorine with chlorine dioxide.
	Elemental chlorine (Cl) consumption is about 75 kg/tonne paper.	Elemental Cl consumption \approx 48 kg/tonne-paper. First elemental chlorine free plant in India.
	No standard for absorbable organic halides (AOX: a group of potent carcinogens). Depends on consumption of elemental chlorine.	Standard for AOX introduced and monitored for the paper industry. Led to shift from elemental chlorine for bleaching and reduced AOX load.
	No standards for colour of the treated effluent from paper manufacturing units.	Andhra Pradesh and Tamil Nadu State PCBs set standards for colour of the treated effluent from paper manufacturing units.
	No water consumption guidelines for the sector.	Water consumption guidelines in paper manufacturing introduced.
Chemical	More than 50% of mercury consumed in the sector is lost or unaccounted, as monitoring end-of-pipe (EOP) emissions in case of mercury not feasible. Solution was to regulate mercury input.	Government of India put in place guidelines to regulate input mercury.
	Use of mercury cell technology resulted in high emission of mercury	Switchover to membrane technology facilitated through: a) subsidies for the import of membrane technology, b) reduction in customs duty on components of membrane cell technology used in the caustic soda industry from 15% to 5%.
Automobile Industry	Supply-chain environmental management: Companies sourcing raw-material and components from small and medium scale sector, which had neither resources nor intent to control pollution.	Companies like Ford, Mercedes, General Motors, Hero, Honda, etc. set clear policy on outsourcing, keeping environmental performance of the supplier in mind. Ford and General Motors asked suppliers to get ISO 14001.
	Companies transferring old technology to their Indian subsidiaries.	Hyundai Motors publicly committed to supply similar technology to India as supplied to Europe or the U.S.
	Little or no efforts on rainwater harvesting.	Companies like Hero Motors, General Motors and Eicher Motors started rainwater harvesting within their plants to reduce external water demand.

Source: IGES 2008

5. Analysis of the constraints on using CEID as a strategy to promote corporate sustainable production in developing Asia

Admittedly few in number, the CEID initiatives reported in the previous section show that communicating corporate environmental information to other stakeholders is a strategy accepted both by companies and governments in developing Asia. While these initiatives

have been effective in reducing emissions and improving environmental performance in many aspects, overall, there is still room for improvement.

Corporate Environmental Reporting (CER) can work more effectively if they increase in number and reach a wider set of stakeholders, and respond to their needs. CERs are still supply driven and scarce with many companies sharing their CERs only in hard copies,

Actions have to be taken both at the supply side and demand side of CERs to make them work more effectively. This is not only a role of government agencies; cooperation between all stakeholders is needed especially in determining guidelines for the content.

which is a costly process and one that reaches only a limited number of stakeholders. Other companies publish their CERs on the internet, but not every company has a website, particularly in developing areas, nor can every stakeholder access the internet for the purpose of checking a particular company's CER. The demand for CERs is also modest. Each stakeholder has different needs and therefore, the potential uses of the information differ. Consumers, for example, need information about the impacts of a company's current activities on his or her

health, investors need information about the overall policy of the company, regulators need information about the level of compliance with specific standards, workers need information about operational risks, and so on, which makes it difficult for one CER to respond to all stakeholders' needs at the same time. Furthermore, some stakeholders are too weak to create enough pressure to force companies to respond to their needs or to check the accuracy of the information provided. Actions have to be taken both at the supply side and demand side of CERs to make them more effective. This is not only a role of government agencies; cooperation between all stakeholders is needed especially in determining guidelines for the content. For example, mandating companies to report their environmental information or rewarding comprehensive CERs can increase the number of CERs. Furthermore, issuing reports based on specific guidelines can ensure the reliability and understanding of the information. Last but not least, enabling easy access to information, developing stakeholders' capacity on how to use available information, and empowering them to take action against companies unwilling to report or companies who report inaccurate information are all actions that can bridge the gap between supply and demand sides for CERs.

Environmental performance rating programmes, although they have not significantly promoted environmental performance for well-performing companies, have been able to bring poor performers into compliance. These initiatives could lead to more improvements in overall environmental performances if the standards are upgraded with time so that companies will keep improving their performance to remain in compliance.

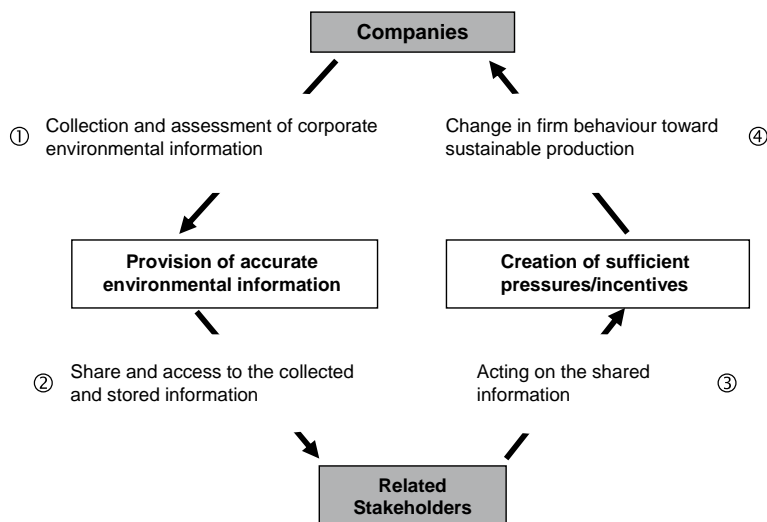
Furthermore, since these rating programmes worked through different channels in different countries, regulators should implement new policies or change existing ones to strengthen weaker channels, such as allowing more democratic media systems to share ratings with a wider audience, and allowing communities and NGOs to take direct action against powerful companies who may refuse to disseminate their environmental information or those who report inaccurate information. Since multinational companies or large companies tend to be better performers, governments can work with them to assist small and medium enterprises with limited financial and technical capacities to improve their environmental performance. Finally, these programmes should be coupled with other command and control and market-based mechanisms.

Command and control should be oriented for those companies which are not in compliance. Using this mechanism is more cost effective now since those companies have become easier to identify. Market-based mechanisms should be oriented for good performers as incentives to make even further improvement. Thus, CEID is a complementary policy to traditional policy instruments.

5.1 Procedures of CEID for promoting corporate sustainable production

Understanding the procedures for using CEID as a strategy to promote corporate sustainable production may help in analysing the outcome of current initiatives in the region, and in identifying the challenges to use it more effectively. Figure 4.8 summarises these procedures. The assumption is that disclosure of information about the environmental performance of a company enables stakeholders to make more sound decisions; and the reactions of stakeholders are translated into incentives and pressure on some companies to change their production behaviour. The process is roughly divided into four stages:

Figure 4.8 Procedures for using CEID to promote corporate sustainable production



Source: Authors

First, each company collects, assesses and stores information related to the impact of its products and activities on the environment and society depending on its own capacity (technical, financial, etc). Other actors, such as government agencies, research institutes and NGOs, also collect and store corporate environmental information independently or cooperatively.

Second, some companies voluntarily share the collected information or part of it with their related stakeholders; others will not do so unless they are requested, or mandated to do so.

Third, stakeholders who are able to access to the shared information, have to act on it. Their actions will largely depend on the characteristics of the information that is at hand and their motivation to act.

At the final stage, some responsible companies will take the perceptions of stakeholders into account and voluntarily change their production behaviour. Others will be enabled

to do so through more informed choice by the government through market-based and enforcement instruments.

5.2 Analysis of current status of CEID in the region and challenges to use it more effectively

For the process explained above to work effectively, some prerequisites have to be fulfilled in each of the four stages. These prerequisites seem to be partially or not fulfilled in developing Asia, which explains, among other reasons, the shortfall of the effectiveness of CEID initiatives taken so far in the region.

Collection and assessment of corporate environmental information

In developing Asia, there is a need to improve the quality and utility of the environmental information that is gathered. There is still a lack of timely, reliable, and appropriate environmental information, which generates scepticism and stakeholders' hesitation to act. For example, there is a need to move from data generation driven by existing ambient standards, to a strategy of generating specific information that is useful to decision-makers and the public. In order to improve the quality of environmental information, it will be necessary to establish clear government standards and formats for environmental information collection and reporting. To verify the accuracy of environmental reports, these reports should be peer reviewed or developed according to reliable third party guidelines such as the GRI reporting guidelines. To successfully establish a performance rating programme based on the colour-coded scheme, it is necessary to integrate the design efforts of a technical team. In the PROPER case, for example, environmental agencies integrated teams from Australia, Canada, and the World Bank to create rigorous protocols for translating the ratings into the current colour-coded scheme.

In developing Asia...there is still a lack of timely, reliable, and appropriate environmental information, which generates scepticism and stakeholders' hesitation to act.

In developing Asia, most companies are SMEs. Unlike large or multinational companies, SMEs in particular have constraints in resources and capacity to collect and store in a given form relevant information about the environmental impact of their operational activities and their environmental behaviour. To help them in this regard, financial and technical assistance through training programmes on information gathering and management is urgently needed.

Share and access to the collected and stored information

The collected and assessed environmental information should reach all stakeholders in an understandable and usable form. Consumers, investors, communities, and regulators may need different kinds of information, and may interpret the information differently. The needs of each stakeholder should be taken in consideration. In the region, environmental performance rating programmes seem to be more effective than corporate environmental reporting because companies in the former scheme were ranked in a colour-coding system that was easy for the public to understand, not just a wealth of data that stakeholders find difficult to interpret. Furthermore, the former is more reliable, since it is conducted by more reliable agencies and not solely based on internal audits and the control procedures of a company. However, environmental performance rating programmes could work even more effectively if there is adequate media coverage of the worst performers. For instance, for PROPER, only 5% of the names of the worst performers are reported in the newspapers.

In developing Asia, there is a gap between the supply side of, and the demand side for, environmental information. Some financial, institutional and political reasons are constraints on information sharing. Even when information is shared, some companies may resort to “green washing” and only choose the kind of information that adds to their green image, while washing over potentially damaging information. Each CEID scheme should consider what information should be shared and with which stakeholders. Information can be fully disclosed where there is a free exchange of information among firms, governments, local communities, interest groups, the media and others who may be interested. To this end, the internet is a powerful tool. Information can be shared locally with surrounding communities or in a specific way by targeting those directly at risk through community advisory committees, arranging facility tours or door-to-door visits. Information sharing can be limited further, such as shared only with regulatory agencies or held internally and not disclosed at all. Answering which level of information sharing is correct for the type of information collected involves balancing the cost and benefits of disclosure.

Acting on the shared information

In some cases, stakeholders have access to information but do not have the power or the motivation to act on it due to the socio-political context. A number of characteristics in developing Asia tend to weaken the reaction of stakeholders to shared information and their capacity to use it. These characteristics include the lack of free press, relatively weak NGOs, communities, legislation, and so on. Citizens also may not be fully given the right to voice their opinion, and are not assured of their position in influencing the decision-making process. Furthermore, there is scepticism about the quality of information and dissemination mechanisms, and a lack of incentives to act on it. Helping stakeholders to act more effectively on the shared information can be accomplished by developing their capacity on how to use available information, motivating them with incentives to use the information, and empowering them to take action against companies unwilling to share information or those who share inaccurate information.

Change in firm behaviour toward sustainable production

The cases of CEID reported earlier lend credibility to the idea that the reactions of stakeholders have an impact on corporate environmental performance. However, there is a remarkable performance improvement difference between the companies. Thus, coupling a CEID scheme with other measures or incentives may yield a better result. For example, providing some incentives such as publicly awarding good performers, as in the case of the PROPER programme, may work more effectively than just disseminating the rating or providing environmental information in annual reports. In addition, for each participating company in PROPER, the Ministry of Environment issues a one-page report on environmental performance. This report serves as an information resource for the company’s managers and environmental engineers, which is more reliable than self evaluation in environmental reporting.

To promote environmental performance on a large scale, the heterogeneity of companies and sectors must be recognised. For example, multinational companies prove to be the best performers because they are more inclined towards cleaner technologies. Thus, providing domestic companies, especially SMEs, with the needed technology and technical assistance is of the utmost importance.

Because some poor performing companies may choose not to change their behaviour at all, their performance could be promoted through stricter inspection and enforcement tools. Alternatively, appropriate market-based instruments could motivate companies that are performing well and have no catalyst to do anything further. Thus, CEID is a complimentary tool of command and control, and market-based policies.

6. Conclusions and recommendations

Governments in developing Asia have mainly worked to promote corporate sustainable production through traditional approaches that looked solely at the relationship between regulators (government) and the regulated (companies). Theoretical and empirical studies show that they have been introduced with varying degrees of success. CEID, as a multistakeholder approach that links companies, the governments, the community and the market is another option that has to be examined. Existing literature supports the idea that CEID can influence corporate activities and characterised it as a third wave of environmental regulations (Tietenberg 1998). Admittedly few in number, the cases of CEID initiatives reported in this chapter also lend credibility to the idea.

Overall, corporate environmental reporting and environmental performance rating programmes adopted in the region have shown obvious effectiveness in reducing emissions, and improving environmental compliance. However, there is a remarkable difference between the reactions of companies to this reputational incentive. For example, accurate corporate environmental reports are still scarce and are mainly produced by large or multinational companies. Their content and quality vary widely and they may supply a wealth of data, but not necessarily the information that responds to the need of stakeholders. Environmental performance rating programmes, on the other hand, seem to motivate more significant emissions reductions for plants with poor performance records. This implies that there is still room for improvement in the effectiveness of CEID as a policy to promote sustainable production in developing Asia.

For this strategy to work effectively, challenges should be taken on the following fronts: first, the provision of accurate information for stakeholders; second, empowering stakeholders to create sufficient pressures/incentives; and third, coupling CEID with enforcement or incentives tools.

The role of stakeholders in the provision of accurate information

Reliable, timely, environmental information of good quality and sufficient quantity should reach appropriate stakeholders in an understandable and usable form. This is a challenging task as there is a gap between what companies are ready to provide and what stakeholders really need to know. Governments are the only institutions with the power to bridge this gap. To this end, the following measures should be taken:

- Establish clear government standards and formats for environmental information collection, and reporting procedures;
- Establish an environmental information clearinghouse in the database division of national environmental agencies to track the collection and management of environmental information;
- Establish systems for quality control and assurance for the disclosed environmental information, which may include a programme for peer review of data and reporting;

- Implement new policies or change existing ones to make clear what information should not be disclosed, what information can be made public, and which stakeholders have access to it;
- Conduct peer reviews to verify the accuracy of corporate environmental reports. To increase their number, companies can be asked to develop voluntary environmental reports according to local and international guidelines such as the European Union Eco-Management and Audit Scheme (EMAS) and Global Reporting Initiative (GRI), which build acceptance of a common framework to report environmental information in sustaining corporate public accountability;
- Integrate the design efforts of a special technical team, or external technical support unit to successfully establish a performance rating and disclosure programme that is accepted by wide set of stakeholders.

Empowering stakeholders to create sufficient pressures/incentives

Stakeholder empowerment and capacity development are prerequisites to achieving sufficient pressure to influence production behaviour towards a more sustainable manner. Lack of a free press, relatively weak civil society, and weak enforcement capacities in the region tend to weaken the power of stakeholders. Citizens also may not be fully given the right to voice their opinion. Empowering stakeholders includes enabling them to access environmental information and developing their capacities through education for sustainable consumption as discussed in chapter 3. Additionally, educated and informed stakeholders may not be able to make positive contributions to influence production behaviour unless they organise themselves and establish mechanisms and partnerships for collective actions toward achieving such goals. Beside the initiatives taken by companies, or supported by the government (as discussed in this chapter), many initiatives are taken by local governments (as discussed in chapter 5) and by communities (as discussed in chapter 6) which reflect that every stakeholder is aware of the issue of sustainable production and consumption, but there is lack of cooperation among all stakeholders. Since the successes of the CEID programmes also vary across countries, transboundary cooperation is also needed for capacity development and win-win outcomes, and to make guidelines and standards consistent.

Coupling CEID with other enforcement or incentive tools

CEID is an effective tool to bring companies into compliance with environmental performance standards. In this regard, regulators can upgrade these standards with time to ensure that companies keep improving their performance so that they remain in compliance. CEID also helps with identifying the compliance level of other companies, which enable regulators to use more informed choices to strategically select policy tools. In this regard, command and control could be oriented for those companies which are below compliance, while market-based mechanisms could be oriented for those above compliance as incentives to make even further improvement.

Learning from the experiences of other countries that use incentives or enforcement tools to promote CEID is also needed in developing Asia. As incentives, establishing environmental reporting awards, such as the green reporting award in Japan,¹³ ACCA award in the UK, the WWF annual environmental award in South Africa, and publicly awarding good performers as in the case of the PROPER programme in Indonesia is a good strategy to promote and encourage businesses to actively disclose and report their environmental issues. Mandating environmental reporting is also an option as in the U.S., Denmark and the Netherlands.

Most SMEs in developing Asia lack the capacity—technical and financial, to collect and assess information about the environmental impact of their activities. They also lack data on how much their efforts toward communicating with their stakeholders contribute to the overall value of the reputation of the company. External technical and financial support should be expanded to help them quantify the cost and benefit of sharing their environmental information with their stakeholders. To this end, national and multinational cooperation is needed.

Most SMEs are not well-known to the public, in terms of either their names or products. Reputational incentives may be not strong enough to promote improvements in their production behaviour, so other enforcement or incentives tools should be applied simultaneously.

And finally, judging from the reported CEID initiatives in this chapter, CEID schemes in developing Asia hold the promise of promoting the environmental performance of companies. To promote sustainable production on a more significant scale, it should be coupled with other command and control and market-based tools. Thus it should be recognised as a complementary tool, not only as a standalone policy.

Notes

1. Further information is available at: <http://www.goodguide.com/> (Accessed 17 January 27 2010).
2. Further information is available at: <http://www.socialinvest.org> (Accessed 27 January 2010).
3. Further information is available at: <http://eurosif.org> (Accessed 27 January 2010).
4. Further information is available at: <http://www.asria.org> (Accessed 27 January 2010).
5. Further information is available at: <http://www.unpri.org> (Accessed 27 January 2010).
6. Further information is available at: <http://www.equator-principles.com> (Accessed 27 January 2010).
7. Is now the Ministry of Environmental Protection.
8. Password may be required.
9. After 2002 BAPEDAL merged into Ministry of Environment.
10. <http://www.infodev.org/en/index.html>
11. Currently the Ministry of Environmental Protection (MEP).
12. In Chinese.
13. Further information about this award scheme and others around the world is available at http://www.enviroreporting.com/mjv_awards.htm

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Chapter 5

Enabling Factors Promoting Local
Initiatives for Sustainable Consumption
in Asia: Potential roles of local
governments

Chapter 5

Enabling Factors Promoting Local Initiatives for Sustainable Consumption in Asia: Potential roles of local governments

Hidenori Nakamura and Mark Elder

1. Introduction

This chapter explores the existing and potential roles for local governments to formulate and implement local initiatives which contribute to sustainable consumption (SC).¹ The focus is on the possibilities for local governments to play a facilitation role for other stakeholders in areas close to the daily lives of household consumers in developing and developed countries.

Although there is a large amount of literature on sustainable consumption, much of it focuses on explaining the nature of the problem and why it occurs, using a variety of perspectives including economic, ethical, and normative (Seyfang 2009; Jackson 2006; Princen, Maniates, and Conca 2002). Much of the discussion is also quite theoretical and abstract. Some studies and reports discuss various general policy measures that could be taken, including general guidance for countries on how to design their national plans (see for example: UNEP 2005; UNEP 2008). The discussion tends to focus on policy at the national level or at the level of individual consumers. In contrast, this chapter is directed between these levels by focusing on the role of local governments and examines actual case studies at the local level.

This chapter demonstrates that there are already a number of examples of these types of actions in Asia, in a range of sectors in a variety of countries and conditions. It also outlines some of the factors that could facilitate the formulation and implementation of

Chapter Highlights

This chapter focuses on the roles local governments can play in formulating and implementing local initiatives which contribute to sustainable consumption. Many case studies are included, with the analysis focusing on the enabling factors for promoting these local initiatives.

- Examples of local initiatives for SC can be found in a variety of countries and sectors in Asia. Common success factors include proactive facilitation of stakeholder engagement by local governments or others; responsiveness to local issues and concerns; support by local government leaders, especially mayors; and external support from national governments, international organisations, or NGOs.
- Mayors and other senior local government leaders should take the initiative to facilitate stakeholder involvement and mobilise resources within and outside of local governments. Even simple encouragement of working level officials or other stakeholders can be helpful.
- Relevance to local issues is especially important for project success. Even local governments themselves may need to pay more attention to this. Stakeholder consultation is very important for gaining their understanding of local relevance, and facilitation, in turn, is important for effective consultation.

local government-led sustainability initiatives. Finally, this chapter examines some local initiatives led by non-governmental organisations (NGO) and communities to explore potential lessons for local governments.

Unsustainable consumption problems in Asia are mainly centred on urban areas. Moreover, urbanisation, along with its related problems, is expected to steadily increase. By 2030, 2.7 billion people will live in urban areas in Asia (United Nations 2004). The population of urban areas is expected to increase by 44 million each year over the next 25 years (Asian Development Bank 2008). The growth of cities creates more economic opportunities, but unplanned or poorly planned urban development brings environmental degradation and problems such as a soaring amount of garbage, untreated wastewater, and water scarcity. As rapid economic growth continues, urban residents are expected to intensify the serious environmental pressures through expanded consumption of energy, water and materials if there is no significant change of efficiency which could reduce demand for resources. Current consumption patterns in Asia are clearly not sustainable, and resources will become increasingly scarce (see for example chapter 1, 4-5, 7-8 of this White Paper).

Cities, however, are not only a cause of environmental problems but also a potential solution. Moreover, national governments cannot solve these problems without cooperation from municipal governments and other stakeholders in cities, since national government policies must be implemented at local levels. Local actions to address sustainability problems are needed in both developed and developing countries. Cities in developed countries need demand and efficiency management to make their consumption patterns more sustainable, while cities in developing countries need to follow alternative development pathways that have different consumption patterns. This chapter does not present a comprehensive vision of these alternative pathways, but instead will demonstrate that there are some pioneering cities that are already taking concrete actions that others can learn from to improve the sustainability of their consumption, and it explores some of the enabling factors of these actions.

1.1 Exploring the roles of local governments in Asia-Pacific

Although they have been given relatively less attention in global discussions, local governments can play a significant role to facilitate local actions towards sustainability. In this study, local governments are defined as municipal governments that are usually responsible for urban services such as waste collection and water supply. Intermediate local governments such as provinces are not the focus. Local actions are vital since all individual and organisational consumption occurs in some locality. To be effective, any national or international policy needs to be implemented by local actions. The implementation of new practices for sustainable consumption is not possible without concrete changes in the perceptions and behaviour of local actors, which in turn is difficult if local actors do not fully understand and recognise their value. Local governments can bring together various stakeholders with different resources and skills and complement national government functions. Since they are closer to local stakeholders, local governments can be more responsive to varied local characteristics.

Most studies addressing the formulation and implementation of local initiatives relating to sustainability have mainly focused on examples from outside of Asia (especially Europe) (e.g., literature surveys in Garcia-Sanchez and Prado-Lorenzo 2008 and 2009). Many studies also focus narrowly on specific areas like clean development mechanisms (CDM) (e.g., Nussbaumer 2009), and with a few exceptions, do not compare lessons across cases (ICLEI 2002c). Also, many studies have mainly focused on plans and planning

processes rather than actual projects, especially those related to Local Agenda 21 (LA21), a programme of the International Council for Local Environmental Initiatives (ICLEI), which focuses on helping local governments develop strategic plans addressing local sustainability concerns using a multistakeholder participatory process (Tuts 2002; ICLEI 2002a; ICLEI 2002b; Garcia-Sanchez and Prado-Lorenzo 2008 and 2009; Pattenden nd).² Some studies (e.g., Garcia-Sanchez and Prado-Lorenzo 2008 and 2009) use quantitative methodology rather than case studies. Many of these are not necessarily focused specifically on the consumption side of sustainability.

Nevertheless, there are a few case studies and databases that include local government initiatives for sustainability in Asia. One is the IGES RISPO-I study, Research on Innovative and Strategic Policy Options, which developed a Good Practice Inventory that focused on innovative approaches in the field of environment (Asia-Pacific Environmental Innovation Strategy Project 2005).³ It comprehensively studied innovative approaches and covered awareness, capacity building, planning, management, organisation, partnerships, economic instruments, regulatory instruments, self-regulation, research and development, and technologies. The Asia-Pacific Forum for Environment and Development (APFED) Good Practice Database is another relevant database that collates case studies on various environmental issues in the Asia-Pacific region with analysis of critical instruments similar to the above.⁴ The RISPO-I Good Practice Inventory was subsequently integrated into the APFED Good Practice Database. The RISPO-I research also identified a broad and comprehensive set of common success factors among the cases (King and Mori 2007a, 2007b). In contrast, this study is much more narrowly focused on the potential role of local governments, as well as success factors related to local governments, while it also emphasises cases that are more closely related to sustainable consumption. The Kitakyushu Initiative for a Clean Environment also developed a database for successful practices in Asia that covered air quality management, water supply and wastewater management, and solid waste management (Kitakyushu Initiative for a Clean Environment 2008). Similar to RISPO-I but different from this study, the Kitakyushu Initiative study's analysis focused on sector specific and technical issues such as waste collection, recycling measures, landfills, financing and administration in relation to solid waste management. In relation to climate change, local governments' policies and measures have been examined in China and Japan (Qi, Ma, Zhang, and Li 2008; Sugiyama and Takeuchi 2008), however only a few cases of policies and practices in specific locations were covered. These studies mainly focused on the contents of local policies and programmes and their relationships with national policies. Other Asian countries and other sustainability policy areas were not studied.

This chapter demonstrates that there is a range of successful cases in Asia, and identifies possible enabling factors in formulation and implementation of initiatives, focusing on the existing and potential roles of local government including facilitation of local stakeholders. To do this, this chapter discusses several cases of local initiatives in Asia in the fields of energy, food consumption, transport, and waste management, where the roles, choices and behaviour of general citizens are critical.

The remainder of this chapter is structured as follows. The next section will discuss the potential enabling factors including the roles of local governments. Then, the case selection will be introduced and the circumstances of each case will be discussed with reference to the potential enabling factors. The final section discusses the results and implications.

2. Enabling factors in the formulation and implementation of local actions for sustainable consumption in Asia and the roles of local governments

This purpose of this chapter is to examine potential enabling factors that could affect the formulation and implementation of local initiatives towards sustainable consumption.

Four main factors are emphasised. The first is the presence of proactive actions by coordinators and facilitators to consult with and engage local stakeholders, which goes beyond simple participation in implementation. This is very important to develop enough sense of conviction to start and continue new practices and policies. Either local governments or NGOs (or both) could play a coordination role. The second is responsiveness to local issues and concerns. This makes it easier for new initiatives and practices to receive the support of local actors. National initiatives dealing with long term sustainability issues such as climate change and biodiversity often do not prioritise or incorporate local developmental issues well, especially when introduced in a top down manner. Local governments also need to pay attention to this. The third is support by local government leaders. Their important roles and actions include political support for obtaining budget resources, institutional setup, persuading stakeholders, and mobilising external resources. The fourth is gaining external support from national governments, international organisations, NGOs, or other experts, who can provide knowledge or financial support. International intercity environment networks such as the Kitakyushu Initiative or ICLEI can assist in replicating some practices and technologies in other cities and countries. For each of these enabling factors, a corresponding potential role of local government is considered: facilitator, designer, leader, and external networker, respectively.

These factors were observed to be important in a previous study on factors affecting environmental policy processes of Asian local governments that are engaged in international intercity network programmes for the environment (Fujikura et al. 2009). Though many possible factors, both endogenous and exogenous to the local area, could affect the adoption and implementation of policies by local governments (Ito 2002), this chapter focuses on factors that can be managed and utilised by local governments when they design, execute or support new practices and policies for sustainable consumption.

Our previous study (Fujikura et al. 2009) demonstrates the importance of other factors such as pressure from residents and NGOs and network activities by NGOs and industrial groups, but these will not be addressed here because it is possible that local governments could formulate projects and policies on their own without pressure from residents or NGOs. Also, chapter 6 of this White Paper, which focuses on community initiatives and empowering communities to carryout sustainability policies and actions, looks into this topic in detail. This chapter considers that local governments should contribute to coordinating the views of various stakeholders, and therefore, focuses on factors which are relevant for local governments and their relationships with other stakeholders.

In general, the factors addressed in this chapter are broadly consistent with the results of previous studies on success factors of local initiatives including those focusing on examples from outside of Asia (especially Europe) (e.g., Garcia-Sanchez and Prado-Lorenzo 2008 and 2009), specific areas like clean development mechanisms (CDM) (e.g., Nussbaumer 2009), and those related to LA21's plans and planning processes (Tuts 2002; ICLEI 2002a; ICLEI 2002b; Garcia-Sanchez and Prado-Lorenzo 2008 and 2009; Pattenden nd). Many lessons involve factors similar to those discussed here, though others are more technical or specific to individual projects. A few factors are different,

especially when compared with the European Union; for example, one study found that political factors, including the stability of the municipal government, are not very important regarding the development of LA21 plans (Garcia-Sanchez and Prado-Lorenzo 2008). Finally, the factors examined in this chapter are broadly consistent with the actor and process variables observed in the RISPO-I study (King and Mori 2007b, 137-9). However, this chapter focuses more narrowly on the local level, including the facilitation role played by local governments.

The importance of these factors may seem self-evident. However, many local governments are not formulating, facilitating or cooperating with local sustainable consumption initiatives, despite the proactive efforts described here and elsewhere, including the steady progress of LA21. Therefore, there is considerable room for improvement. Many local leaders may still believe that sustainable consumption is not relevant for local concerns in their area, especially in developing countries, and may be suspicious of cooperating with local NGOs or other groups, not imagining the potential for cooperation with international organisations or even their own national government. Therefore, it is hoped that the analysis in this chapter can contribute to changing the mind-set of more hesitant and sceptical local leaders, and that they might find some inspiration in the case studies described here.

3. Cases of local initiatives for sustainable consumption in Asia

This section introduces a number of cases of local actions in four relevant fields of sustainable consumption where there is room to increase citizens' involvement: energy, food, transport, and waste management. These four areas were selected because they illustrate practices that are implemented or facilitated by local governments and include engagement of households, citizens and communities. These areas also range broadly along the production chain, from inputs like energy, to household consumption of food and transport, and finally to waste disposal as the final consumption stage. These areas are also identified in regional meetings hosted by UN agencies and others (e.g., UNEP 2001). Because waste management is one of the more common issues relevant to local residents and is dealt with by local authorities, cases in this area are considered even when reducing consumption is not the main goal. Moreover, waste can be influenced by changing the behaviour of household consumers.

The case discussion highlights the roles of actors who initiated the process of new practice adoption, stakeholders engaged in the process, the process of adoption and implementation of new practices and policies, obstacles the local actors faced and how they were overcome (or not), and the roles played by local governments. Then enabling factors are identified.

Cases with a high degree of engagement of local residents and stakeholders at the time of project implementation were selected from both developing and developed countries to illustrate a range of countries and sectors. These are mainly successful cases, although some also illustrate difficulties that were not solved. Here, cases are considered successful if they completed the implementation of the intended initiative. Although this set of cases is not representative or comprehensive, it does demonstrate that successful cases do exist in a wide range of countries and sectors. The main criterion for selecting these particular cases was sufficient information to assess the potential enabling factors. Only one of these cases is from existing case databases (Asia-Pacific Environmental Innovation Strategy Project 2005; Kitakyushu Initiative for a Clean Environment 2008).

3.1 Energy

Case 1: Integrated industrial development, regulation and education to promote solar power, Rizhao, China

Case 1 illustrates an initiative coordinated by a local government and supported by local government leaders, which brought tangible benefits to local stakeholders (C40 Cities nd).

Rizhao is a coastal city in Shandong province, China with a per capita income lower than most other cities in the region. Faced with expected energy and environmental constraints under rapid economic growth, the mayor decided to implement strong policies to promote renewable energy, focusing on solar power, including provision of financial support for research and development by local solar panel industries. The Shandong provincial government also subsidised research and development for the solar water heater industry.

Both regulatory and public education policies resulted in widespread adoption of solar heaters. The city government required all new buildings to install solar panels, and it monitored construction activity to ensure implementation. It also raised public awareness through open seminars and television advertisements. The first solar panels were installed in government buildings and the residences of city government senior officials. Some government agencies and companies provided free installation of solar panels for employees (not including repairs and replacement).

The mayor and local government officials saw a positive relationship between improved environmental quality and the long run economic and social development of the city. It is estimated that the solar water heaters reduce carbon dioxide emissions by at least 52,860 tonnes a year. The State Environmental Protection Administration (currently Ministry of Environmental Protection) designated Rizhao as an Environmental Protection Model City (C40 Cities nd).

Rizhao shows how industrial development and sustainable energy consumption can be aligned. The initiative was led by local government leaders and coordinated by the local government by combining regulatory policy, financial incentives and public education. The local government proactively coordinated with both industries and households. The initiative was also supported by provincial government policy.

Case 2: Relocating people to energy efficient houses to protect an ecological zone, Puerto Princesa, the Philippines

Case 2 is about an initiative coordinated by the local government with support from the mayor and an external organisation, which addressed local livelihood concerns (Aquitania 2008).

To protect the ecological systems in Puerto Princesa's bay area, a mass housing project was developed to relocate around 800 households whose increasing population had been threatening the coastal reserves. The mayor directed the city engineer's office to design eco-efficient homes for the relocated families. The house designs were revised several times. Also, the secretariat of ICLEI Southeast Asia, which promoted the local government's climate protection campaign, tried to help the city to link the relocation project with their climate protection efforts. By using compact fluorescent lamps (CFL) instead of incandescent bulbs, the households could cut their energy bills by around 60%. In addition, energy demand would decrease by 30-40% due to the eco-design,

including natural illumination and ventilation, the cooling effect of the roofing material, and tree planting by each household. The estimated annual energy savings from the project was about 120,000 kWh, potentially saving about \$35,000 per year. A disposal system for non-recyclable and non-biodegradable waste, and backyard composting to reduce waste, were also planned.

Families engaged in fishing initially opposed being relocated since it would involve additional transportation expenses to reach the coastal area. However, after a series of consultations and dialogues, which helped the residents to understand the importance of ecological conservation and prompted them to reconsider their means of livelihood, they agreed to relocate. The personal presence of the mayor in these dialogues facilitated the process (Aquitania 2008).

This case illustrates the relevance of economic benefits of lower energy bills for the residents who accepted relocation for ecosystem conservation. The local government's extensive stakeholder consultations, in particular the mayor's direct engagement, were the key to obtaining the residents' eventual understanding and co-operation. External assistance from ICLEI helped to incorporate the co-benefits of climate change mitigation into this project.

Case 3: Use of biofuel for public vehicles, Chiang Mai, Thailand

Case 3 describes an initiative coordinated by the local government, with the support of an external organisation, to produce biofuel from waste to address a local concern about air pollution from public utility vehicles (Siam CIE International Co., Ltd. 2008). Although the project succeeded in producing biofuel from waste, it was used in vehicles other than the ones originally intended. However, the project still produced sustainability benefits even though the original objective was not completely met.

Chiang Mai is the largest city in northern Thailand and the capital of Chiang Mai Province, situated in a valley that traps air pollutants. To reduce air pollution, the Chiang Mai city government decided to produce and use biodiesel from waste cooking oil as an alternative fuel for *songteaws*, the main public utility vehicles, as part of its master plan (2000-2010) for improving air quality. A demonstration project for 1,000 *songteaws*, with a total budget of THB 9.8 million (about \$300,000), was launched in 2004 by the Ministry of Energy as part of its biodiesel programme, and the Pollution Control Department (PCD) conducted cost-effectiveness and environmental impact assessment studies. The demonstration project aimed to use waste cooking oil to produce biodiesel, construct community-level small-scale biofuel plants, and promote the use of biofuel to reduce environmental and health impacts caused by air pollutant emissions. Several local organisations such as Chiang Mai University were involved in the design, construction, and testing of biodiesel equipment and conducted community training.

The original project aimed to use the biodiesel for the *songteaws*. However, instead, it is being produced by private entrepreneurs and used in the villages to fuel pickup trucks and agricultural machinery. *Songteaw* drivers did not trust biodiesel from waste cooking oil, preferring to buy a 5% biodiesel blend (B5) from service stations. Still, sustainability benefits were realised since biofuel from waste cooking oil is still being produced and used, even if not by the originally intended consumer. Now, Chiang Mai city plans to produce first generation biodiesel for its own vehicles from energy crops such as palm oil planted on vacant lots (Siam CIE International Co., Ltd. 2008).

In this case, the biodiesel project was a response to a local air pollution problem as well as economic incentives from high oil prices, and the local government devoted significant effort to it. The failure to utilise biofuel as originally intended suggests insufficient coordination with stakeholders, although ultimately the fuel was used by other groups, and therefore, sustainability objectives were still achieved. The national government's renewable energy programme contributed to this project.

Case 4: Generation of electricity and fertiliser from organic waste in household garbage, Rayong, Thailand

Case 4 illustrates an initiative where the local government effectively coordinated local stakeholders to solve a pressing waste disposal problem, with commitment from the mayor and external support (UNESCAP 2003; Siam CIE International Co., Ltd. 2008).

Rayong City, the capital of Rayong Province, is located about 180 km east of Bangkok, with a population of 59,000. The city faced difficulties in handling increasing amounts of municipal solid waste (MSW) resulting from rapid economic development and a growing population. The old landfill was full, and it was difficult to find a replacement site. Rayong also joined the ICLEI Cities for Climate Protection (CCP) programme with strong support of the incumbent and former mayors, and committed to reduce CO₂ emissions by 15% from the household sector.

For these reasons, the city government adopted an integrated plan for a community-based waste management scheme including recycling, production of organic fertiliser, and production of biogas to generate electricity. The waste-to-fertiliser and energy project aimed to process 60-70 tonnes of MSW per day. The cogeneration capacity was designed at 625 kW and was expected to produce 5,100 MWh of electricity annually. The plant to produce organic fertiliser had an expected economic life of 20 years. In 2003, Rayong generated around 27,000 tonnes of MSW annually, about half of which was estimated to be organic. The biogas project, initiated by the former mayor, was preceded by an intensive campaign to encourage separation of waste at source and recycling. For example, the city provided 12 and 100-liter plastic bins to households and participating businesses to segregate organic wastes. The contents of these bins were sent to the biogas facility.

The mayor of Rayong stressed the importance of community participation in order to reduce costs. Former mayors were also supportive. The city government consulted with city residents regularly, kept them informed, and organised ad-hoc teams to build and strengthen community networks to preserve environmental quality. These groups initiated many activities to persuade people to participate in separating and collecting wastes, including establishing waste banks where recycled waste could be traded for eggs, and a project involving hydro-microorganism fermenting activity which produced odourless waste that can be used as liquid fertiliser or deodorizer for restrooms, drainage ditches, or refuse dumps (UNESCAP 2003).

The project was undertaken in the context of the national strategy on community-based management of natural resources and environment problems that had been established after the Ninth National Economic and Social Development Plan (NESDP 2002-2006).

National and international experts assisted Rayong in the project's development and implementation. Department of Energy Efficiency experts assisted in the project's technical design. Experts from the European Community-ASEAN Cogen Programme also provided technical expertise in the implementation of the project as a full-scale cogeneration project, as well as financial assistance (Siam CIE International Co., Ltd. 2008).

In the Rayong case, the landfill space shortage was an important local concern. Support of the current and former mayors was important for initiating the project, while local government officials effectively engaged local stakeholders and coordinated and facilitated community-based waste segregation and electricity generation. Financial and technical support from national and international organisations was also important.

Case 5: Use of biogas from treated wastewater, Denpasar, Indonesia

Case 5 illustrates an initiative responding to local problems and coordinated by domestic and international non-governmental organisations (PUSTRAL 2008; ICLEI SEA 2004).

This project using biogas from treated wastewater in Denpasar was developed in response to complaints of nearby residents about the wastewater from small- and medium-sized soybean processing companies. The project started in 2003 when companies received technical cooperation support from German and local NGOs. Small-scale biogas processing facilities were installed with the residents' participation, which involved treating wastewater from businesses as well as domestic wastewater from households. Support was provided for the formation of community hygienic groups in 2004 in order to treat domestic wastewater based on an agreement with the Denpasar City Environment Bureau. Six to eight tonnes of wastewater are treated per day at one biogas processing facility, and the gas produced is used for cooking and lighting. According to a report by ICLEI, it is estimated that 149 tonnes per year of greenhouse gas emissions have been reduced at two processing facilities. In addition, it was calculated that the biochemical oxygen demand (BOD) could be reduced by 90% by purifying wastewater, in addition to a savings of IDR 23 million (about \$2,300) per year compared to using kerosene and liquefied petroleum gas (LPG). By 2007, 16 biogas-processing facilities were constructed. Polluting enterprises bore 5% of the installation costs of these facilities, and the German NGO covered the remaining costs. However, it has been difficult to secure funds for further expansion of the project (PUSTRAL 2008; ICLEI SEA 2004).

This Indonesian case directly responded to local concerns and complaints, with cooperation, coordination, and benefits for many stakeholders. NGOs coordinated and organised community groups, while the local government extended the hygiene programme, and initiated formal programmes to support community activities. This division of labour is similar to that of Surabaya, Indonesia, as described in case 12, where a foreign NGO provided substantial financial and technical assistance.

3.2 Transport

Case 6: NGO-led coordination for pedestrianisation, Yogyakarta, Indonesia

In Case 6, an NGO coordinated stakeholders to solve a local issue but still encountered difficulties (ITDP 2008).

In a bid to transform a conventional city centre, the local government in Yogyakarta, Indonesia, wanted to improve pedestrian accessibility in order to bring back shoppers and tourists by allowing them to avoid the frequent traffic congestion in that area. Traffic was rerouted along one of the most important commercial streets and tourist destinations, cutting traffic volumes by about 30% in 2005. Also, several elevated pedestrian crossings were constructed. The Institute for Transportation and Development Policy (ITDP) dispatched an urban designer to meet with local authorities. He introduced the case of Copenhagen, Denmark where large-scale pedestrianisation was successfully implemented in the city centre.

Further pedestrian improvements were blocked by at least 13 groups from all strata of society who were profiting from using the public space along the road, including six vendor associations controlling specific areas, several *becak* (pedi-cab) unions, several organised societies of street children who earn petty cash by helping the vendors, and one or two legal chambers of commerce. The rest were essentially protection rackets and criminal gangs, mostly controlling parking, with strong connections to government officials (ITDP 2008). Intran, a local NGO, organised a dialogue with stakeholders along the street to try to develop a plan that incorporated their concerns.

This case is not necessarily a successful one, but it still provides some lessons. It shows the difficulties and importance of engagement of diverse stakeholders related to the new pedestrian improvement project, as well as the coordination efforts by local and foreign NGOs. Pedestrianisation is intended to be people-friendly, but the concept of “people” should be broad enough to accommodate all stakeholders (Nitisudarmo 2009). Local governments should take this into account and ensure adequate coordinating and facilitation when promoting local initiatives.

Case 7: Limits on the use of motorised three-wheelers in the city centre, Butuan, the Philippines

Case 7 illustrates an initiative coordinated by the local government, with support of an external organisation, which was relevant to a local concern (Aquitania 2008).

The city of Butuan is located in the northwestern part of the Caraga Region, the Philippines, with a population of around 270,000. In response to major environmental problems stemming from pollution emitted from motor vehicles, in 1997, the city government passed an ordinance prescribing guidelines for the prevention, control and abatement of air pollution from vehicles. In addition, the city government passed another ordinance to reduce the number of motorised tricycles operating within Butuan from 3,000 to 2,000.

Through the assistance of ICLEI under the CCP campaign, the Butuan city government developed its GHG emissions inventory as part of the city’s decision to integrate local environmental concerns with the global climate change issue. This revealed the transport sector to be the biggest source of the city’s GHG emissions, followed by the residential and industrial sectors. Butuan therefore concentrated its reduction efforts on the transport sector, which also has a co-benefit of addressing the air pollution problem (Aquitania 2008).

In this case of Butuan, the ability to address local concerns about air pollution was an important factor motivating the local government to introduce a climate change mitigation policy which would otherwise not be a priority. ICLEI played an important role in successfully convincing the local government that climate countermeasures could effectively address local concerns. ICLEI also provided some support to the project by assigning a climate coordinator and climate team. The local government played an important coordination role, including development and implementation of two ordinances.

3.3 Local food production and consumption

Case 8: Local production of organic rice and town revitalisation, Ikeda, Japan

Case 8 introduces a practice that was coordinated by the local government, with support of a local government leader, and which addressed local concerns for revitalisation and sustainability (*Kankyo shuto kontesuto zenkoku nettowaku* and *Hai raifu kenkyujo* 2009).

The town of Ikeda in Japan's Fukui prefecture is located in the central part Japan's main island, with a population of around 3,500. Mountainous forests and rice fields cover more than 90% of the town area. Concerned about the decreasing number of farmers in the town, whose population had declined 18.7% over a decade by 2005 (*Kankyo shuto kontesuto zenkoku nettowaku* and *Hai raifu kenkyujo* 2009), the mayor developed the idea of establishing a store, called *Koppoi-ya*, meaning "thankful" in the local dialect, to sell organic rice and other agricultural products produced by Ikeda's farmers at a shopping centre in Fukui, the capital city of Fukui prefecture with a population of 270,000. The store is also managed by people from Ikeda. Ikeda has its own certification mechanism for organic foods, in particular for products consumed by farmers themselves; today, around 160 farmers are participating. The mayor decided to focus on Fukui city, which is closer to Ikeda, rather than larger markets such as Tokyo and Osaka. In 2007, the annual sales through this store exceeded 20% of Ikeda's total agricultural sales.

Other sustainable agricultural production methods have also been introduced in Ikeda. The town developed a centre to produce fertilisers from organic waste generated by town residents by mixing dung and rice husks. Collection of household organic waste is implemented by local non-profit organisation volunteers, of which about one third are town government staff. The fertiliser produced at the centre underpins Ikeda's agriculture.

One of the success factors was the mayor's effort to develop and deepen the trust between local government staff and local residents. The mayor identifies agriculture as "a part of life, bond among people, art for living, and the cornerstone of local lives." Before becoming mayor, he started cultivation with friends while working as an agricultural consultant. He also began a green tourism package that invited people to come and experience the agricultural way of life. His ideas and experiments also included a contract-based cultivation company and development of a facility where urban residents can stay and experience agriculture in Ikeda. One of the most successful projects was the store to sell locally certified vegetables, discussed above.

In this case, revitalisation of the town and improvement of the quality of life for residents were the primary objectives of the new initiatives, which were also aligned with sustainability issues through reduced chemical use and increasing usage of organic waste. Commitment and support by the mayor, who actively coordinated between the town and external stakeholders, was clear. Local government staff also facilitated citizens' participation.

Case 9: Urban allotment gardens by local governments, Cagayan de Oro, the Philippines

Case 9 illustrates a local government-coordinated initiative responding to a local issue with support of an external organisation (ICLEI 2008; Holmer and Drescher 2005).

In Cagayan de Oro, located in the southern Philippines, a project to establish four urban allotment gardens, aimed at increasing the well-being and food security of the urban poor, was implemented with financial support from EuropeAid's AsiaUrbs Programme.

Allotment gardens are small land parcels of about 200 to 400 square meters that are assigned to individuals, families or associations. They help secure food, improve livelihoods of urban residents and promote sustainability. The local government makes an allotment garden legally available to an association under the condition that they be used exclusively for growing vegetables, fruit and cut flowers.

The local government fully supported the project by passing a city ordinance to promote allotment gardening by providing tax incentives for landowners who make land available for urban agriculture, and requiring space for allotment gardening in residential areas.

The city government selected four *barangays* (the smallest local government unit in the Philippines) as pilot areas based on its experience from a previous waste segregation project. The pilot allotment gardeners are from two main groups: (i) people who are already engaged in urban agriculture but have insufficient land, and (ii) those who need alternative income sources but have no access to land.

Survey results show that a quarter of the production of allotment gardens is consumed by the gardeners themselves, 7% is given to their relatives and friends, and around 70% is sold in the neighbourhood.

Implementation has not necessarily been easy. The gardeners needed to settle various issues, such as which technologies to use, financial management of the project, and roles and responsibilities of gardeners (ICLEI 2008; Holmer and Drescher 2005).

In this urban gardening project in the Philippines, the initiative was relevant for the citizens that were interested in urban agriculture and yet had no access to land. The local government facilitated the diffusion of the new practices through a local ordinance, which shows a high level of commitment.

3.4 Waste management

Case 10: NGO-led community waste management and composting, Dhaka, Bangladesh

Case 10 is an NGO-coordinated initiative that addressed local problems and was supported by external organisations, from which the local government learned the role of coordination from an NGO (C40 Cities nd; Enayetullah 2008). It also involved local stakeholders and citizens.

In the early 1990s, Dhaka, Bangladesh's capital, had no landfill or incineration facilities, and half of the waste generated—1,200 tonnes a day—was unmanaged. This poor situation caused wastewater problems and spread disease. To address this problem, two local individuals created an NGO called Waste Concern in 1995, which started a pilot community-based composting plant with land donated by a local club. The project organised several small enterprises for composting in various locations in the city. The enterprises were to be responsible for door-to-door waste collection, waste separation, composting of organic waste, and sales of compost and recyclable materials. Once the project was successful, the Ministry of Environment and Forests replicated the project in five additional places under the auspices of the United Nations Development Programme (UNDP). Waste Concern asked for the support of governmental agencies in terms of land, water and electricity for composting facilities.

One of the biggest challenges was land availability since land prices in Dhaka were soaring and the local government refused to provide city-owned land. The local government agreed to provide land for a composting facility only after demonstration of the project's effectiveness and the establishment of a good relationship with the local government.

This community waste management project created around 400 jobs to operate compost machines and collect waste door-to-door in slums. Job creation helped to positively

engage community stakeholders. The project is also estimated to have contributed to the reduction of 18,000 tonnes of CO₂ equivalent emissions, while the organic fertiliser produced by the project is sold to farmers. Dhaka earns money from municipal waste by selling carbon credits and fertiliser (C40 Cities nd; Enayetullah 2008).

An NGO played a key role coordinating between the local government and the community. The local government was unenthusiastic at the beginning but eventually supported the initiative by providing land. The initiative was quite relevant to local concerns since it provided waste management services to previously unserved areas, and created jobs. The NGO also organised a door-to-door waste collection system and community-based composting plant. External support from the national government and international organisations was obtained to replicate the practice.

Case 11: Community waste composting and separation of valuable materials, Naga, the Philippines

Case 11 illustrates a local government-coordinated initiative relevant to local issues and supported by local government leaders, in which local government provided enabling regulations (Aquitania 2008).

Naga City is a regional centre for the Bicol Region of the Philippines with a population of 137,810. It is also well known in the Philippines for experiments to improve city governance. The city generates 62 tonnes of garbage per day, half organic and half non-organic. The city government aimed to integrate this local waste management issue with global climate change mitigation. As such, in 1998, the city participated in the ICLEI Southeast Asia's CCP campaign. The city committed to undertake the five milestones of the campaign and implement the waste recycling project as a concrete action.

The project focused on developing materials recovery facilities (MRF), which aim to reduce, reuse and recycle waste, by composting biodegradable wastes and separating valuables. The MRFs were pilot tested in nine out of the city's 27 districts (*barangays*). Only two are still in operation; the other seven become inactive due to changes in district leaders and their agendas. In the two successful cases, support of local leaders, good management by the *barangay* office, and monitoring support by the local NGO were important.

Another enabling condition was the national Local Government Code which gives authority to local governments to establish their own solid waste disposal system and facilities related to general hygiene and sanitation. The city enacted an ordinance in 1995, establishing the Ecological Waste Management Program for Naga even prior to the passage of the Ecological Solid Waste Management Act of the Philippines. The ecological centre of Naga was producing organic fertiliser from biodegradable waste in 1996.

This case simultaneously improved livelihoods and reduced health hazards. Community waste management in Naga has improved the incomes of waste collectors since they have been appointed by the city and included in the policies.

Another important factor was the existence of appropriate staff in charge of a particular area. In Naga, the chairman of the city environmental committee became heavily involved in the project and helped with instructions and political recommendations. This facilitated the implementation of the CCP programme (Aquitania 2008).

This case illustrates the importance of local relevance, support of local politicians, and coordination efforts. The local government played an effective role during the formulation and institutionalisation stages. Difficulties in maintaining the initiative show that the existence of coordinators and facilitators at each operational unit is important to keep attention focused on societal benefits.

Case 12: Reducing waste through composting, Surabaya, Indonesia

Case 12 demonstrates facilitation by the local government, coordination by local NGOs, relevance to local concerns and successful support by an external organisation (Maeda 2009).

Surabaya City in Indonesia, with a population of three million, has significantly reduced its waste generation from 1,500 tonnes per day before 2005 to 1,150 tonnes in 2008. The city has intensively promoted composting practices by consolidating composting centres and distributing thousands of compost baskets to residents, and organised a community cleanup campaign with local NGOs, private companies and the media.

Composting was introduced and diffused in Surabaya in three main stages. First, a solid waste management model was developed in one community through intercity technical cooperation since 2004 between the Kitakyushu International Techno-cooperative Association (KITA) from Kitakyushu City, Japan, and Puskota, a local NGO. Later, an efficient composting method appropriate to local conditions was developed and successfully adopted. A modified method for households was also widely used. New composting centres were established, and thousands of compost baskets were distributed to the residents for free, to scale up this practice. The city government outsourced distribution to a women's group and other NGOs because of their grassroots networks. These NGOs organised a network of environmental community leaders to teach citizens how to compost and explain the environmental and health implications. Now there are about 28,000 community leaders in the city.

Surabaya, in collaboration with NGOs, private companies, and the media, has also organised a community cleanup campaign—the Green and Clean Campaign—since 2005. By 2008, around 20% of the city's districts were participating. Wide media coverage in local newspapers and TV programmes as well as at city government events helped attract attention.

Since distributing compost baskets and operating a composting centre are financially feasible and residents can earn income by household composting, the composting practice has spread from one community to many other parts of the city with active involvement and coordination among stakeholders. The city and the women's group in particular played a significant role in coordinating various stakeholders. Through other initiatives and programmes, similar practices have been adopted in many other cities in Indonesia and elsewhere, which have succeeded in reducing waste (Maeda 2009).

In this successful case, both the local government and a local NGO played important roles in coordinating and facilitating various stakeholders, although the initial idea was developed through collaboration between a local NGO and an international technical cooperation provider. The local government provided the financial, institutional and physical assistance to facilitate and empower the activities of local NGOs, which can mobilise residents through their grassroots network. The collaboration and division of responsibility between the local government and NGOs were important for successful coordination. The new practice effectively met the needs of communities to clean the environment and also helped citizens to earn additional income.

Case 13: Using organic waste from the public market to produce fertiliser and detergent, Tungsong, Thailand

Case 13 describes an initiative coordinated by the local government and supported by the local government leader, which addressed a local issue (Siam CIE International Co., Ltd. 2008).

Tungsong is a town located in Nakhon Si Thammarat province in southern Thailand. From its wastewater management facility, Tungsong has produced organic fertiliser (12,000 kilograms) from household sewage and livestock manure and organic fertiliser, and liquid detergent (36,000 litres) from market waste since 2001. The organic fertiliser production is estimated to generate an annual income of \$1,200 for the town.

As a part of participation in the ICLEI CCP, the Tungsong municipal government extended the solid waste management programme producing liquid detergents to cover the entire municipality. The Tungsong sanitary district office organised community leaders to produce and sell the product from organic wastes. Tungsong also operates a waste-recycling bank.

Coordination by local government staff is conspicuous. The chief librarian of Tungsong's Public Library is the coordinator of local environmental initiatives, including the CCP. The library is also responsible for organising all information, education and communication campaigns, and networks with schools and students. The sanitary district office is responsible for implementing the programme. The director of the office has been responsible for organising and maintaining the informal association of community leaders, most of them women, who produce and sell the liquid detergents from organic wastes. The mayor generally supported the local environment protection programmes, which ensured that a sufficient number of officials were assigned to the programme.

Tungsong also received assistance from the Thailand Environment Institute (TEI) in designing the climate action plan, although Tungsong was financially sufficient in implementing its local environmental initiatives (Siam CIE International Co., Ltd. 2008).

In this case, strong support from the mayor, effective and capable coordination by local government staff, and responsive community engagement were observed. Income generation from solid waste management was very relevant to the local community, which aided in securing the support of the local government to effectively mobilise and coordinate schools, networks of community leaders, and women's groups. Thus, the local government played an important facilitating role. Finally, support of external experts was important for climate action planning but not for actual solid waste management and waste recovery.

Case 14: Zero waste approach for resources management, Kamikatsu, Japan: Tackling the root problems of waste management through sustainable lifestyles

In Case 14, a city aimed to avoid future reliance on landfill and incineration. Facilitated by the local government, supported by the mayor, and coordinated by a local NGO, the project effectively addressed local problems (Kasamatsu and Sato 2008).

Kamikatsu, located on Shikoku island in Japan, is a small mountainous town with a population of about 2,000. More than half of the residents are over 65 years old, yet the town has an ambitious goal to realise a sustainable community by the end of the twenty-first century. Faced with financial difficulties to secure incinerators and safe landfill sites,

Kamikatsu changed its way of thinking about waste. The town now separates household waste at source into as many as 34 categories, more than anywhere else in Japan. One hundred percent of organic waste is made into other materials, and 70% of other wastes are reused or recycled. Kamikatsu was the first local government in Japan to declare a “zero waste” policy, stating in 2003 that it would reduce the amount of landfilled or incinerated waste to zero by 2020.

The Kamikatsu government does not have waste collection vehicles. A small incinerator closed after three years of operation. There are no waste collection sites, final landfill sites, or staff in charge of waste treatment. The only facility relevant to waste management is a garbage station where town residents bring their waste for separation.

Before 1993, Kamikatsu, like many other towns, burned its waste in an open area without treatment, due to the lack of financial resources for an incinerator or final landfill site. Although the national law required local governments to use incineration, the town conducted a feasibility study on recycling since the town did not intend to invest in incineration or a landfill site.

After the feasibility study, the town government initiated an organic waste composting programme by subsidising the purchase of composting equipment by each household by nearly 90%. The town government also supported the introduction of commercial-grade composting equipment to the elderly care centre, food supply centre, restaurants and hotels. Now, 98% of households practice composting, and the rest use organic waste directly for their fields and gardens.

The number of waste separation categories was steadily increased from 19 in 1997 to 25 in 1998, after extensive consultation between the town government and local residents, and 35 in 2001 after two small incinerators were closed because one no longer met national environmental standards. This reduced the amount of waste for incineration from 140 to 48 tonnes per year. The number of recycling categories is significantly greater than required by national law.

In 1998, the town established a garbage collection centre where residents bring their waste for separation, instead of having it collected by the town government. Volunteers help people who need assistance in transporting their waste to the centre.

Today, Kamikatsu generates 436 grams of waste per resident per day, which is around 40% of the national average (Kasamatsu and Sato 2008). The cost of waste treatment by local governments per resident is around 60% of the national average.

A local NGO called Zero Waste Academy operates the garbage collection centre and coordinates volunteers as well as residents' engagement with zero waste actions (Kasamatsu and Sato 2008).

In this Japanese case, the initiative began as a reaction to open dumping and lack of financing for an incinerator or sanitary landfill. The waste management problem was very relevant to the town. Strong leadership by the mayor and coordination roles by local government staff, as well as an NGO, to persuade and mobilise town residents were observed. This case is a demonstration of effective collaboration between the local government and a local NGO where the process was facilitated by the local government. This case shares some similarities with the case of waste composting in Surabaya, Indonesia, and demonstrates the relevance of such programmes in both developed and developing countries.

4. Conclusion: Implications for local governments

This section concludes the chapter and discusses implications for local governments working on sustainability issues. Table 5.1 indicates which of the potential enabling factors were present in each of the 14 cases.

Table 5.1 Selected enabling factors for local initiatives

Case study	Selected enabling factors				
	Coordinating role		Relevance to local issues	Support by local government leaders	External support
	Local government	NGO			
Case 1: Energy (China)	x		x	x	x
Case 2: Energy (Philippines)	x		x	x	x
Case 3: Energy (Thailand)	(x)		x		x
Case 4: Energy (Thailand)	x		x	x	x
Case 5: Energy (Indonesia)		x	x		x
Case 6: Transport (Indonesia)		(x)	x		x
Case 7: Transport (Philippines)	x		x		x
Case 8: Food (Japan)	x		x	x	
Case 9: Food (Philippines)	x		x		x
Case 10: Waste (Bangladesh)		x	x		x
Case 11: Waste (Philippines)	x		x	x	
Case 12: Waste (Indonesia)	x	x	x		x
Case 13: Waste (Thailand)	x		x	x	
Case 14: Waste (Japan)	x	x	x	x	

Note: In Cases 3 and 6, the (x) in parentheses under the coordinating role indicates that inadequate coordination hindered the progress of the respective initiatives.

Source: Authors

All cases indicated the importance of coordination and facilitation among local stakeholders for both formulation and implementation of new local initiatives. Moreover, this is true in developing as well as developed countries, for example in the cases of waste management and waste-to-energy in Thailand and in the case of waste management and recycling in Kamikatsu, Japan. The role of local governments was particularly important in the cases of waste management in Indonesia, Thailand and Japan, local food production

in Japan and the Philippines, transport in the Philippines, renewable energy utilisation in China and Thailand and energy efficiency in the Philippines. NGO coordination and facilitation roles are also observed in the cases of waste management in Bangladesh and Indonesia, food production in Japan, and transport in Indonesia.

The cases of waste management in the Philippines, pedestrianisation in Indonesia, and biofuel utilisation for public transport in Thailand also demonstrated that the lack of sufficient coordination and communication among stakeholders could lead to the delay or failure of new initiatives. Moreover, the case of waste management in Bangladesh illustrates the possibility of a local government being a potential obstacle to local initiatives rather than a supporter, where they hesitated to provide land for a material recycling facility.

An important implication is the desirability for local governments, especially in developing countries, to play facilitative and enabling roles, so that other appropriate stakeholders, such as NGOs, can do the actual implementation – essentially leveraging each stakeholder group's expertise and capacity. Another important implication is the importance of changing the mindset of local officials, so that even if they cannot initiate or support new initiatives, at least they could refrain from obstructing appropriate initiatives led by other local stakeholders.

An important implication is the desirability for local governments, especially in developing countries, to play facilitative and enabling roles, so that other appropriate stakeholders, such as NGOs, can do the actual implementation – essentially leveraging each stakeholder group's expertise and capacity.

The relevance of new initiatives to local issues was important in all cases. The implication is that when a local government or NGO tries to begin an initiative to tackle sustainable consumption issues, it is vital for it to consider the relevance to local issues so that the initiative not only solves sustainability issues but also deals with local economic or environmental problems. The initiative should bring about tangible economic benefits to local stakeholders engaged in the initiative—as opposed to implementing the project simply for the sake of sustainability. For example, waste segregation and composting in Bangladesh created new employment and income opportunities in addition to providing cleaning services in a slum area. The case of local food production and consumption in Japan helped revitalise a small town in addition to enhancing local material circulation and reducing food mileage. Of course, linkage to local issues may be easier said than done. Better prior stakeholder consultation may help potential projects to be more effectively linked to local issues and concerns.

Support of local government leaders is found to be important in half of the cases, including both developing and developed countries. In particular several cases demonstrated the importance of the commitment and actions by mayors who initiated the projects and followed up on their implementation, including the cases of waste management in Thailand and Japan, local food production and consumption in Japan and biomass utilisation in Thailand. Since there are other successful cases where support of local government leaders was not present, it cannot be concluded that their support is essential for the success of local initiatives for sustainable consumption. Yet the case studies showed that in cases where the projects enjoyed support from senior local government leaders, this support eased their implementation, especially for mobilising resources, as exemplified in the cases of Tungsong, Thailand and Puerto Princesa, the Philippines.

Lastly, around two-thirds of the cases indicate the importance of external contributions by national governments and international institutions and organisations to local initiatives in the context of developing countries. International institutions and organisations include international NGOs based in developed countries, international developmental organisations and the secretariats of international intercity network programmes. They provided either technical support for planning, inventory development and specific technology, or financial support to construct facilities or procure equipment. When the financial assistance is for projects which generate financial returns, such as power generation, securing additional funds for further extension is probable. However it is difficult to further develop or replicate projects which rely on contributions from external organisations as is discussed in the case of waste management in Indonesia.

Nevertheless, the results suggest that the support of the local government leaders and external assistance, although helpful, is not always necessary to initiate and implement local initiatives for sustainability. Out of the 12 cases in developing countries, two cases from China and Thailand show no reliance on international support. Therefore, this should encourage local actors working on sustainability issues not to simply wait for leaders or external supporters as a precondition of their efforts. Since too much reliance on external support may lead to non-sustainability of the initiatives, project promoters and donors should consider how to ensure the project's long term sustainability.

Another finding is that these enabling factors, which focus on the process of formulating and implementing local initiatives, are broadly similar regardless of the level of economic development, social diversity, or even the nature of relations between central and local governments. On one hand, the demonstration of the importance of factors such as communication, leadership and coordination among local stakeholders may not seem very surprising. On the other hand, this finding is significant in that it demonstrates several broad commonalities among a group of Asian countries with a wide range of national circumstances and conditions and across a range of sectors. Moreover, there may still be the perception in some quarters that there are few examples of "good practices" in developing countries in Asia, and this study confirms research by other recent IGES studies (RISPO-I, Kitakyushu Initiative, APFED) that quite a few cases can be identified. Therefore, the results of this study, combined with these other IGES studies may justify a cautious optimism, demonstrating that local initiatives to promote sustainability can be successfully initiated and implemented in Asian developing countries in a wide range of conditions and sectors.

Despite these encouraging cases, many local government leaders are not initiating or supporting sustainable consumption initiatives. One possible reason is that local leaders may not be convinced that sustainable consumption is relevant to local issues, especially in developing countries, although it must be stressed that this study did not explore the factors affecting the motivation of local leaders. Nevertheless, the cases in this chapter should provide encouragement to local leaders that sustainable consumption initiatives clearly can be effectively formulated to address local issues. These cases also highlight the role that NGOs or other groups can play in explaining the benefits of such projects to the local community in order to gain the support of local government leaders. It is important to understand that despite good intentions of project proponents, sometimes local leaders and other stakeholders have difficulty understanding the local benefits, and sometimes project proponents have miscalculated the potential effects of the project. Some cases demonstrate

It is important to understand that despite good intentions of project proponents, sometimes local leaders and other stakeholders have difficulty understanding the local benefits, and sometimes project proponents have miscalculated the potential effects of the project.

that multistakeholder consultation and dialogue can be important not only in helping stakeholders to understand a project's benefits, but also in helping project proponents to understand the limitations of their original plan and to adapt it more appropriately to local conditions. Therefore, these cases should provide encouragement to local government leaders to adopt a more positive stance towards sustainable consumption projects, and also encouragement for project proponents (which may include local governments in some instances) on how to improve the linkage with local issues.

To conclude, implications for local governments working on sustainable consumption issues at the local level are as follows:

- Local governments, particularly in developing countries, are encouraged to do more facilitation and enabling so that other local actors such as NGOs can implement activities, thus better utilising local stakeholders' grassroots networks and mobilisation capacity. Local governments could support such community organisations by providing information, finance and capacity development for community leaders. Local governments could consider enhancement of their own facilitation capacity as a long term capacity development objective.
- At the designing and formulation stage of new initiatives, local governments are encouraged to incorporate local social, environmental and economic interests and concerns into sustainability projects and programmes. This is especially the case when a new initiative starts as part of a national programme or a project supported by international organisations that already have a specific sustainability agenda that is not necessarily directly related to the local context.
- Mayors and other senior local government leaders should take the initiative to coordinate and mobilise resources within and outside of local governments, and to persuade local stakeholders. However, even simple encouragement of working level officials or other stakeholders can be helpful.
- Working level officials in local governments should take advantage of the window of opportunity created when local political leaders make a commitment to support the formulation and implementation of initiatives for local sustainability.
- In order to secure financial resources for initiatives, national governmental programmes and assistance by international actors could be mobilised. However, it is better for local governments to use these resources and opportunities to implement their own policies and programmes to cope with local issues, and not to be fully directed by external supporters. Local governments should be selective in order to maintain local ownership of initiatives.
- It is important to have a clear plan to ensure that new initiatives can become self sustaining, especially when external support is provided.
- Designing and implementing adequate processes for communication among stakeholders should be a priority. Local governments or NGOs need to coordinate interactions among different local actors engaged in new initiatives. Occasional repetition of communication and dialogue can help to identify perception gaps among stakeholders and to create and maintain momentum. Communication is also important to identify local concerns and interests, foster general understanding of sustainability issues, and develop an understanding of the linkages between them. Utilisation of existing active local social networks is a conventional way to promote local engagement.

Notes

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2. Garcia-Sanchez and Prado Lorenzo (2009, 1041) state that "the number of research papers dedicated to analyzing the implementation level of the Local Action Plan is very low."
3. RISPO-I was part of the Asia-Pacific Environmental Innovation Strategy (APEIS) Project, <http://enviroscope.iges.or.jp/contents/APEIS/RISPO/>
4. <http://www.apfed.net/ki/database/gp.php>

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Chapter 6

Community Engagement in Sustainable
Consumption and Production:
Empirical lessons and grass-root
perspectives

Chapter 6

Community Engagement in Sustainable Consumption and Production: Empirical lessons and grass-root perspectives

Masanori Kobayashi¹

1. Introduction

Recognising the significance of the role of the community in promoting sustainable consumption and production (SCP), this chapter highlights the dynamism of community-based resource management, and draws lessons on how to empower communities toward more effectively undertaking sustainability policies and actions.

The chapter is based on empirical studies of projects undertaken under the auspices of the Asia Pacific Forum for Environment and Development (APFED).² It intends to address three questions regarding the functioning of communities: (i) what factors prompt communities to act collectively (or inhibit them from acting collectively) for promoting sustainable consumption; (ii) under what conditions can communities act most effectively; and (iii) how can community actions influence macro-policy and institutional transformation towards promoting sustainable consumption? To answer these questions, three steps were followed: (i) determine the analytical framework for the envisioned case studies, (ii) analysis of selected case studies, and (iii) examination of linkages between community types and policy factor performance in the context of promoting SCP.

Based on this analysis, a set of recommendations are then presented for mobilising communities and promoting collective policies and actions for SCP.

Chapter Highlights

The focus of this chapter is on the role of the community in SCP by drawing on case studies from the Asia-Pacific region of local initiatives for SCP. To this end the chapter looks at the following key points in developing policy oriented empirical lessons:

- Analyse and build on the strengths of community characteristics when choosing the type of activities that communities are expected to undertake towards SCP.
- Governance and information based measures are a key to successful community involvement, but need further intervention to stimulate the interface between macro-policy and field level actions.
- Openness of the community to external facilitators and innovative technology is an important success factor, and there is merit in choosing a community that has such openness when there is uncertainty regarding community acceptance of innovative technology and practices.
- Motivating and mobilising people remains a key success factor, and mind-ware issues, such as environmental ethics and awareness, need to be taken into account in addition to software (social systems and regulations) and hardware (urban or land development).
- Multistakeholder partnerships are a tool to amplify project impacts and safeguards communities from risks associated with innovative projects.

The concept of community has been applied to various kinds of aggregations of human beings and interpreted in different ways (Warburton and Yoshimura 2005). Community is defined, for instance, as a network of relationships among people, groups, traditions, and other behavioural patterns under respective regional conditions (Flecknoe and McLellan 1994).³ Marquis and Battilana (2009) state that most definitions of community underline some combination of relatively small scale, boundedness, and strong ties among members of communities, and distinguish it from “society,” as a larger and more impersonal form of relationship. In the development discourse, community is referred to as a group of people who reside in a certain geographical or spatial boundary. The scale of geographical area varies according to context, and is sometimes synonymous with administrative units. Community members may have either similar or different backgrounds in terms of occupation, ethnic origin and culture. Although perceptions on community may differ, it is nevertheless recognised as an important unit that plays a vital role in socio-economic activities.

The community’s role in sustainable development has been highlighted since the 1990s in response to Chapter 4 of Agenda 21, the United Nations (UN) action plan for sustainable development from the Earth Summit held in 1992 (UN 1992). Much of the literature emphasises the importance of community engagement for sustainable development especially with regard to natural resource management and conservation through approaches such as participation and decentralisation (Chambers and McBeth 1992; Agrawal and Gibson 2001). Meanwhile, sustainable development has tight linkages with SCP. In relation to this, the UN guidelines for consumer protection encourage the promotion of SCP among its member states with a view to reinforcing SCP measures within society, including consumers, government sectors, and businesses (UNEP and Consumers International 2004). There is growing realisation that communities are one of the most important players for achieving SCP (Sustainable Development Commission 2003; Herman et al. 1994). For example, the Johannesburg Plan of Action 2002 articulates the role of community in promoting sustainable development, particularly in the aspect of SCP emphasising approaches such as “changing unsustainable patterns of consumption and production” (Section III) and “rural community participation to develop and utilize indigenous energy sources and infrastructure” (Para 20 (g)).

2. Analytical framework

The community functions and performance in policy processes have been analysed from various perspectives. An analytical framework normally rests on key pillars that govern community behaviour such as law, norms, culture and identity (Marquis and Battilana 2009) and regulative, social-normative, and cultural-cognitive features (Scot 2001). Others underline the governance structure of community (Taylor 1999) or representatives and participatory systems (Rako and Flint 2001) to analyse the co-relation between community characteristics and policy performance.

In the context of natural resource management, analysis is conducted on property ownership (Sikor 2006) as a key socio-economic factor that influences forest resource management at the local level. With respect to fund mobilisation, Hunter and Staggenborg (1986) assert that community homogeneity and coherence as determined by its smaller boundary are factors that raise efficiency in financial resource mobilisation.

A number of factors have been considered as potential elements of the analytical framework to address the cases collected from APFED activities. The governance structure was one critical factor. Many communities have developed village councils or

village association consultative and decision making mechanisms and their decision making processes are deemed as generally participatory although the extent of such elements varies from case to case. Legislative and normative features including property rights could have been a part of the analytical framework. However, the cases presented in this chapter vary in their tenure arrangements ranging from natural resource management of common property (e.g., water, forest resources and land) to private property (e.g., houses and wastes).

There seems to be a correlation between community behaviour and size, not just in terms of geographical space, but also in terms of economy and market, and the extent of economic inter-dependency within the community and with external communities. The cases presented in this chapter are intended to illustrate such co-relations in community-based activities to tackle specific sustainability challenges. The homogeneity of communities provides an explanation on behavioural difference to some extent. However, there are several other factors that can provide a basis for better analysis regarding the difference in community behaviour such as whether there is a conflict of interest between community members regarding the issues addressed in the various project activities. Even when the governance structure is deemed as akin, it is understood that community behaviours differ substantively with or without a dominant actor in the community.

Based on this understanding, the following section analyses selected cases from three viewpoints, namely (i) whether the community operates a small, simple economy or a large and interdependent economy through communal markets or with markets outside of the community; (ii) whether there is any conflict among stakeholders in the community; and (iii) whether a certain actor exercises dominant power in the decision making and/or policy/project implementation processes.

3. Case study analysis

In the following case study analysis, 13 projects were selected from APFED Phase II (APFED II) programmes that are relevant to community engagement in SCP. APFED II activities launched in 2005 include the Showcase Programme and the Ryutaro Hashimoto Award Programme. The Showcase Programme is designed to support innovation in terms of policy, social mobilisation, and technology application toward achieving sustainable development in Asia and the Pacific. The Ryutaro Hashimoto Award Programme intends to acknowledge good practices of Asia and the Pacific in promoting sustainable development and facilitate their replication while tailoring them to local conditions. Over the past five years, 49 Showcase Programmes have been supported and 27 Award Projects were analysed as case studies. For this chapter, 13 case studies were selected that are more illustrative of the co-relation between community characteristics and behaviour in promoting SCP. The following is a brief description of the project cases based on the aforementioned analytical framework and is the basis for further discussion on the co-relation between community characteristics and behaviour in promoting SCP in the subsequent section. For the convenience of reviewing the 13 cases, they are clustered under (i) energy consumption and production, (ii) consumption of materials and resource efficiency, (iii) consumption of biological resources, and (iv) sustainable food consumption and production.

3.1 Energy consumption and production

Project 1: Enhancing productivity in the utilisation of bio energy (Sri Lanka, Showcase 2006)

To promote non-fossil fuel energy as a part of the effort to mitigate climate change, Practical Action, an international NGO, in collaboration with the Rural Centre for Development, a local NGO based in Nikaweratiya, Sri Lanka, supports the experimentation of jatropha (*Jatropha curcas*), an oil producing shrub tree, for biofuel production in the community of Gurugoda. Community members plant jatropha around their farms and gardens as hedgerows or live fences to block the intrusion of livestock. Villagers harvest the oil bearing jatropha seeds and sell them to a local jatropha processing centre. Community members also purchase processed jatropha biofuel for motorcycles and operating tractors. The community benefits from offsetting gasoline needs and increased income from the sale of jatropha seeds. By promoting jatropha plantation in the margins of farmlands, the community has also evaded a land use conflict with food production.

Economic size

- The community is based on a subsistence agrarian economy, and the majority of community members are engaged in small scale farming, with no notable manufacture.

Conflicts of stakeholder interests

- The community has long been engaged in community development activities with international aid agencies that have brought in a windmill power generator and reduced the cost to community members for electricity. Such previous experience in the community helped enable the introduction of the plan to grow jatropha.
- Jatropha biofuel remains expensive (LKR 300/litre) and does not pose any threat to petrol retailers as the petroleum price remains competitive (LKR 110/litre).



Jatropha plant in Sri Lanka
(photographed by I. Kikusawa)

Actor dominance

- Community members share a homogeneous character and there is no stakeholder group that exercises dominant power in decision making and project implementation.

Project 2: Community-based educational and partnership actions: Carbon neutral initiative for community empowerment and climate change mitigation in Indonesia (Indonesia, Showcase 2007)

The project intends to promote non-fossil fuels by installing micro-hydro power generators to provide alternatives to fossil fuel and local fuel wood. The project is promoted by the Indonesian Institute of Science (LIPI), Bogor Institute of Agriculture and local communities. Micro-hydro generators can supply electricity through the use of abundant water resources flowing in streams that provide water for local paddy land. The schemes match local topographic and climatic conditions as the communities are

situated in humid, hilly areas that provide essential conditions for micro-hydro power generation. In addition, by generating electricity in the backyard of the house, the households that manage micro-hydro collectively reduce their electricity bill payments, and the surplus can be invested in productive activities thereby raising income levels and providing savings to send children to schools.

Economic size

- The community is in a rural area where agriculture is the major source of income. Community members are mainly small scale farmers. A few are engaged in shoe making for infants. The average income ranges around the national poverty line.

Conflicts of stakeholder interests

- Water resources are abundant as the volume of water flows in paddy land irrigating streams constantly remains high. No conflict is observed over water use. Community members are mainly Muslim and no ethnic or commercial interest conflict is observed.
- As the cost for installing micro-hydro power generators remains high, it is basically impossible for community members to install generators without grant fund provisions by the government or an aid agency. Micro-hydro does not pose any threat to the State Power Company, PLN.
- Micro-hydro options may be favourable to PLN in the long run as it would be very costly to meet the government's target of achieving universal access to electricity across the country particularly in remote rural areas.

Actor dominance

- The installation of micro-hydro power generators is carried out within the compound of a privately-owned property. There is no administrative procedure that hinders the use of waters flowing adjacent to the private land. The village chief was said to be supportive of the innovative action for experimenting on the first micro-hydro scheme in the community. No actor exercises any power over the decision making process of the individual community members who have decided to install and operate the micro-hydro power generators.

Project 3: Community-based wind energy system in the Philippines (Philippines, Showcase 2008)

Wind power is another energy source alternative to fossil fuel. The project's objective was to operate a wind energy system and was undertaken by a small local community enterprise called Sibol ng Agham at Teknolohiya Inc. A small-scale wind turbine technology has been constructed for the community in Lamag, an area with wind flows in considerable velocity. This technology supplies low cost electricity to communities in areas far away from a grid connection and which cannot afford an expensive power generator. As wind velocity varies over the season and time of day, proper planning to assess climatic conditions was required. The presence of a military base was another factor that made the planning process more complicated. The provision of electricity to allow motorisation of sugar cane processing is expected to increase sugar productivity thereby by raising the revenue of the community and improving the local living standards.

Economic size

- The project is implemented in a rural agrarian community with a small population. The local economy is small and subsistent in nature. The energy generated by the wind power turbine is used by a few farming households. There is no electricity transaction with the people outside of the group that have implemented the project.

Conflicts of stakeholder interest

- The project enables the community to avoid the use of kerosene for operating machinery to process sugar cane by using electricity generated by a wind turbine. With the motorised sugar cane processing machinery, sugar cane production has risen considerably. Local stakeholders and commercial agents were not inconvenienced by the introduction of the wind turbine. The presence of the military base simply raised a point of not disturbing military operations and this was a matter of simple precaution as the wind turbine was at a height that could potentially obstruct military operations.

Actor dominance

- As the wind power generation system is small scale, there was no potential loss of revenue by the national electricity corporation, and the military authority simply required the community to be cautious in order to avoid hindering air force operations. In such circumstances, no particular stakeholder group is dominant in decision making and implementation processes.

Project 4: Supporting farmers with silk houses and solar power for sericulture promotion (Nepal, Showcase 2006)

Sericulture is an important productive activity in the community in Nepal. This silk production promotion project is implemented by Energy and Environment Nepal, a local NGO. Before the start of the project, kerosene was used in the process of drying cocoons and silks. Smoke from kerosene and fuel woods was a cause of respiratory disease, fires and skin burning accidents in the community. By introducing solar power for drying cocoons and silk, the community succeeded in substituting solar power for fossil fuel and fuel wood and gave the community a sense of joining global efforts to mitigate climate change. With the introduction of solar drying systems, silk production has increased by 20% and fuel wood use has reduced substantively. The project also included other ecologically oriented projects, such as introducing a biogas plant using livestock manure and experimenting with composting activities to produce organic fertiliser.

Economic size

- The project is implemented in the community of Gandaki, a rural agrarian community where almost all the households are engaged in small scale agriculture. The economic activities in the community are thus considered as small, simple and subsistence in nature.

Conflict of stakeholder interests

- Initially a group of families was sceptical about the cost-benefits of introducing environmentally sound technologies such as solar power generation and biogas power generation systems. However, as many of the families have started experiencing an increase in silk productivity and household revenue, and a reduction in kerosene and fuel wood use, such sceptics have ceased to voice their concerns about the project. No substantive conflict was observed in the community.

Actor dominance

- In the small rural agrarian community where all members share a common interest, no domination by a particular actor was observed in the decision making and project implementation processes.

Project 5: Indonesia's utilisation of Kyoto Protocol's Clean Development Mechanism to enable investment by the private sector through public-private partnership (Indonesia, Award 2008)

The clean development mechanism (CDM) offers a useful international policy framework for promoting investment in environmentally sound technology. The CDM was established under the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC) as a mechanism to reduce greenhouse gas (GHG) emissions. PT Gikoko Kogyo Indonesia, a local enterprise supporting public interests, has developed a project that intends to capture methane gas from landfill sites and use it for bio-energy power generation. This project is outstanding in terms of mitigating climate change impacts since methane gas is known to be the major emission source from landfill sites, with a global warming potential 23 times higher than CO₂. What made this project so innovative was that PT Gikoko Kogyo has made an agreement with the local government authority and community to invest 7-10% of the revenue expected from the sales of the emission reduction credit (Certified Emission Reductions, CERs) into improving the systems of the local authority for collecting wastes, and ameliorating the living conditions of waste pickers/scavengers. The project was successfully registered as a CDM. However, the sales of CERs have not yet been completed and the subsidised low electricity price and the high transaction cost of using the power grid owned by the national power company, PLN, make it difficult for PT Gikoko Kogyo to make additional investments to install a power generator using collected methane gas.

Economic size

- The project is implemented in a community that has a relatively large geographic area, and that consists of members engaged in diverse economic activities. The community members' socio-economic conditions also vary widely. Thus, the economic size of the community is considered as large and inter-dependent.

Conflict of stakeholder interests

- There is a substantive level of stakeholder interest convergence as PT Gikoko Kogyo, the local community and local authority share the same interests in having public investment to upgrade waste collection systems and establish a public infrastructure for socially marginalised groups. However, the arrangements have not yet been concluded for distributing electricity through the grid owned by the national power company, PLN, as the power grid access fee are considered to be high. No attempt has been made to retrieve and use the organic material from landfill sites due to the varying views over the quality of organic material. Thus, although the objectives of the project have been achieved, there is still a work to be done to resolve existing conflicts of interest and achieve the final objectives.

Actor dominance

- The situation can best be described not as actor *dominance*, but rather a social and systemic structure that prevents PT Gikoko Kogyo from securing the favourable socio-political conditions conducive to achieving the project objectives more effectively. Innovative actions were made possible, but not fully to the extent needed to achieve the ultimate objectives. The electricity company, PLN, local government, farmers' groups and scavengers all have their own individual interests and have exercised their influence during the project. Yet, the extent to which such influence is exercised has not reached the level where one group can qualify their respective position as a dominant actor.

Project 6: Enhancing eco-efficiency and sustainability in primary industry (Thailand, Showcase 2006)

The Society for the Conservation of National Treasure and Environment (SCONTE) in collaboration with the Thailand Environment Institute (TEI) intends to enhance eco-efficiency in primary industries in Thailand as a way of reducing pollution and increasing resource use efficiency in food production and manufacturing sectors. As a part of their project activities, SCONTE and TEI intend to bring mutual benefits to business and civil society by improving resource efficiency and profitability for the company, and assuring safety in groundwater and clean air for the community. Various corporations participate in environmental training activities aimed at promoting cleaner technologies, energy efficiency improvement measures, pollution control actions, and other corporate social responsibility (CSR) activities. The project has been successful in raising environmental performance at the corporate and factory levels. Reductions in the use of resources also suppress the cost of production thereby raising profitability. However, they have not been successful in changing environmentally unsound practices when there are no immediate economic gains or when there can be short term economic losses. Community members residing in the areas around businesses remain impartial or are not informed of environmentally detrimental impacts, thus unsustainable business practices continue. Further advancing the achievement of project objectives would require not just decisions and actions by senior management, but also identification of shared interests with the government, local community and other business partners to facilitate a transformation to a more holistic policy and market framework in order to change production patterns.

Economic size

- Project activities have been implemented by a number of companies participating in the project. Production facilities and factories of companies that participate in the project are located in a relatively large scale community that is part of a developed and multi-faceted economy.

Conflict of stakeholder interest

- Pollution control and resource efficiency measures are promoted as a part of voluntary corporate actions and are not necessarily initiated out of any requirement to comply with government laws and regulations. Companies with increased profitability share a part of revenue with the community by investing in community development activities. However, certain changes proposed in the product design and production process have not yet materialised due to policy deficiencies. A bill banning single tier underground oil tanks was drafted over ten years ago, but has yet to be put into effect. Bans on using a single layer underground oil tanks and the legislative requirement for using a triple layer underground oil tanks are standard in many developed countries. In addition to a lack of market and public monitoring systems to support such changes, the short term loss expected from such changes is a major obstacle in changing product design and production methods.

Actor dominance

- Each corporation participating in the project has been carrying out their own activities more or less autonomously as they belong to different sectors of industry. The corporations have publicised successful aspects of changes in product design and production methods, however, there has not been much information shared on the difficulties faced by the corporations in changing product design and production methods to achieve higher environmental performance and sustainability. In the absence of information on policy, market and public monitoring deficiencies, a leading actor has not been identified in the decision making and implementation

processes. Social and systemic fragmentation and disconnection makes it difficult for corporations participating in the project to remove remaining obstacles to change product design and production methods.

3.2 Consumption of materials and consumption efficiency

Project 7: Youth leaders for waste-wise communities (Fiji, Showcase 2008)

The acronym “3Rs” calling for society to “reduce, reuse and recycle” waste has been influential in raising awareness and promoting actions to improve resource use efficiency even at the community level. Live and Learn Environmental Education (LLEE), a Fijian NGO, has undertaken a project to encourage the community to conserve and promote efficient use of environmental resources and product materials. Training workshops were conducted to promote environmentally sound resource and waste management practices such as composting and recycling. Organic and resource circulating farming practices have been introduced as well. A unique feature of the project is the involvement of youth leaders in the training programme to encourage them to disseminate their newly acquired knowledge and skills within their own community. As a part of the project implementation process, monitoring and evaluation are carried out to share successes and failures, and to ensure the delivery of expected outcomes. Throughout the project activities, the people participating in the project have been changing their consumption patterns, thereby reducing waste generation and promoting resource circulation.

Economic size

- The project has been undertaken in remote rural areas with limited economic activities. Youth groups are engaged in farming and fishery or otherwise unemployed.

Conflict of stakeholder interests

- People participating in the project generally promote the use of personal bags to be used repeatedly as a substitution for one-time-use and disposable plastic shopping bags, and composting by processing biodegradable kitchen wastes to be used as organic fertiliser. Such activities have not resulted in conflict with other stakeholders. The activities are widely accepted by the community.

Actor dominance

- LLEE and youth groups operate through communication and mutual understanding, and there is no evidence of a particular stakeholder group dominating decision making and project implementation processes.

Project 8: Promoting the 3R concept for sustainable solid waste management (Nepal, Showcase 2007)

Marsyangdi Rural Development Organisation (MARDO), a Nepalese NGO, has undertaken a project to provide training for people in Gokarneswor village to promote 3R actions. MARDO encourages community members to separate waste and practice composting of biodegradable wastes while supporting organic agriculture activities. MARDO has provided each household participating in the project activities with a composting container to support their waste separation and composting activities. Families have succeeded in producing marketable organic fertiliser from composted biodegradable wastes and the revenue from the sales of organic materials works as a concrete incentive for local people to stay engaged in 3R activities. The community devises its own plans to promote sound material and waste management practices thereby supporting SCP.

Economic size

- The target community is a rural agrarian village, and its economic activities are small scale and at the subsistent level.

Conflict of stakeholder interests

- Project activities are broadly accepted by the community as waste segregation and composting of organic materials are seen as a positive contribution to improving public hygiene and restraining soil and water contamination. Micro-enterprises have been developed through project activities as a recycling business, and this has not caused any conflict with existing socio-economic organisations.

Actor dominance

- MARDO steers project activities in close collaboration with community members, local stakeholders and the local government. As the project activities are broadly accepted, each of the community members and stakeholder group support project activities. The project activities can be sustained through self-help efforts by community members and do not necessarily require any substantive and additional financial and human resource input. The revenue generated from the sales of composted organic materials is also shared by participating households, and no particular conflict has been observed.

Project 9: Capacity building for sustainable construction in rural north-eastern China (China, Award 2008)

In Heilongjiang Province, northeast China, the Adventist Development and Relief Agency (ADRA), an international NGO, has collaborated with local communities for about a decade to promote energy efficient housing. As a target community is in a wheat production area, ADRA has elected to promote a project to apply straw bales as insulation material for housing. Compared to conventional houses constructed of brick and rock, straw bale housing is efficient in insulation which reduces fuel consumption. The project helps reduce GHG emissions not just from reduced fuel use at the



Construction of straw bale building
(Photograph courtesy of ADRA)

household level, but also from the production of bricks. Straw bale housing also helps reduce health risks of respiratory disorders from smoke generated by using coal in the house, and improves the resistance of houses to earthquakes as straw bale has better elasticity and can absorb earthquake shocks to some extent.⁴ The local government has enforced a ban on excavation and mining for brick production, and brick production itself as a way of halting land degradation, and has secured farm land, as well as enforced policies to tackle climate change and air pollution. The project supports such policy objectives as well. In comparison with conventional brick houses, the cost of constructing straw bale houses is much lower. It has also created new business and employment which is good for the local economy. More than 600 buildings have been built as of 2009.

Economic size

- The project has been implemented in a rural agrarian community. However, the volume of agricultural production is large and the level of economic activities is deemed as substantive. The market economy is well developed and community

members purchase food and household items at local stores. As a sign of economic dynamism, business entrepreneurship can be also observed in developing straw bale producers and house construction companies. The community is also open to foreign organisations such as NGOs and research institutes and has developed constructive partnerships to carry out project activities effectively. The local government also supports project activities as the project supports the general policies of the local government.

Conflict of stakeholder interests

- Under different conditions, there could have been a conflict of interest between business operators engaged in the production and sale of bricks and straw bales. However, as brick production has already been banned nationwide, such conflict does not exist. Farmers now have extra revenue sources by selling straw as construction materials. Community members have surplus income from reduced coal procurement for heating houses, and invest the surplus in constructing greenhouses and cultivating vegetables to gain additional income.

Actor dominance

- ADRA has taken the lead in promoting straw bale insulation methods and related technology. Such promotion has been carried out through multistakeholder partnerships involving the community, farmers groups, businesses and the local government. In such circumstances, no particular stakeholder group dominates decision making and project implementation processes.

Project 10: Solid waste management as a social enterprise: A community-based 3R approach (Philippines, Showcase 2007)

The Bago City Solid Waste Management Board (CSWMB) has carried out a project on solid waste management since 2008, which intends to establish a financially self-sustained, community-based solid waste collection (composting and recycling) system in order to promote environmentally sound waste and resource management, reduce poverty and malnutrition, and promote public health and sanitation. Waste composting and recycling have particular advantages in providing business and market opportunities for stakeholders. So far, multiple objectives have been achieved through the implementation of the project, including a 50% reduction in waste, improved sanitary conditions, a decrease in dengue fever incidents, increased income, enhanced community awareness, and strengthened community partnerships.

Economic size

- The project has been implemented in 24 communities in Bago city. A highly developed market economy is already in operation in the city. The project involves a wide range of stakeholders, both in the formal and informal sectors, including the local government, private businesses, NGOs, student groups and scavengers.

Conflict of stakeholder interests

- At the initial phase of the project implementation process, there was evidence of conflict between scavengers and project promoters as the proposed waste collection and management systems would reduce the volume of waste that scavengers could collect for revenue. However, communication and awareness raising activities have been carried out to promote better public understanding on the basis of improved waste collection and management systems to achieve multiple public policy objectives.

Actor dominance

- The local government of Bago city has played a leading role in the project implementation process in collaboration with other stakeholders such as communities, NGOs, businesses, and student groups. Dialogues and consultations have been promoted to ensure mutual understanding of the public interests of improved waste collection and management systems. In this process, no dominant power was exercised by any of the stakeholder groups.

3.3 Consumption of biological resources**Project 11: Promoting public participation in protection of Viet Nam's wildlife (Viet Nam, Award 2007)**

Wildlife poaching and illegal trade has been a grave social concern in Viet Nam in terms of conserving biodiversity and protecting endangered species. Education for Nature Vietnam, a Vietnamese NGO, has been carrying out a project on environmental education programmes to promote public understanding with respect to the need to protect endangered species and increase public collaboration to halt illegal wildlife poaching and trade. One of the key features of the project is a "wildlife hotline." Tigers and bears are poached illegally for the trade of bones and gallbladders, respectively, as alleged aphrodisiacs, a claim that is rebuffed by mainstream science. Community members keep an eye on illegal trading of wildlife and its by-products and operate public peer pressure systems involving the media, as well as undertake consumer education programmes to curb such transactions. From the beginning of 2005 to the end of 2006, almost 400 cases were reported and culprits were arrested in over 80% of cases. By 2008, more than 1,400 crime cases were reported and documented. The information disclosure on illegal trafficking of wildlife and its products and prosecution of culprits reinforces the actions taken by local authorities and communities to suppress illegal poaching and trading of wildlife.

Economic size

- The project has been implemented with the involvement of a broad range of members of communities that operate in a relatively large market economy. The communities have multiple stakeholders who are engaged in various economic activities.

Conflict of stakeholder interests

- Wildlife conservationists have been confronting illegal traders of wildlife and their products, including illegal exporters and users in the underground markets. There are other intermediaries who benefit from assisting the illegal transactions such as local traders in both exporting and importing countries.

Actor dominance

- Conservationist groups have taken a strong hold in the entire process of project implementation, and their activities have been supported by the public and enabling policies provided by the government. Wildlife conservation is a part of the obligation and policy goals articulated by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Under such national and international policy frameworks, conservationist groups are able to take the lead and spearhead project implementation, thus exercising dominance over other groups. Public awareness and education campaigns have also contributed to winning public support for their activities.

3.4 Sustainable food consumption and production

Project 12: Improving rural livelihoods: Promoting sustainable and safer vegetable production (Bangladesh, Award 2008)

Excessive use of agrochemicals, particularly pesticides, was a severe concern for maintaining public health and ecosystems in Bangladesh. Untrained and unknowledgeable farmers spray pesticides without using proper masks and taking appropriate precautionary measures. Pesticides sometimes include those that are not approved for use in the country or have been banned internationally, but are illegally imported from neighbouring countries that have been accumulating stocks of banned agrochemicals. Drainage laden with chemical substances pollutes underground water and soil resulting in consumers ingesting high levels of agrochemicals that are detrimental to human health. The Bangladesh Agricultural Research Institute (BARI) and the World Vegetable Centre collaborated to implement a project called the Pheromone Trap Use for Pest Control. It is intended to promote economically and environmentally sustainable Integrated Pest Management (IPM) strategies, promoting sex pheromone traps for pests as an alternative to pesticides. This new IPM technology successfully reduced pesticide use by 65-75% in Bangladesh and India project sites and achieved up to a 30% reduction in the cost of production. As a result, participating farmers have gained an increase in their net income by about 60% as a result of IPM. The project implementation process involved pilot projects, dialogue meetings, training, and media campaigns with the involvement of multiple stakeholders, including farmers groups.

Economic size

- The project is being implemented in rural agrarian communities that have a relatively large number of farmers and trade their agricultural produce in the capital city of Dhaka and its neighbouring cities.

Conflicts of stakeholder interest

- There is a conflict of interests between project promoters and conventional pesticide producers and retailers. However, farmers have been very responsive to the fact that pheromone traps have been less expensive and more effective in curbing pest infection of vegetables, and the swapping to the pheromone traps from pesticides has increased their net income. The government reduced subsidies to agriculture inputs including pesticides, thus supporting the shift. Market conditions and sound government policies have proven conducive to successful implementation of the project.

Actor dominance

- BARI and the World Vegetable Centre have offered the option of pheromone traps for insects that other farmers had experimented with in the past and have been proven to be effective. The local business sector responded by creating a venture company to produce pheromone trap lures and market them to the farmers. The government ensures that its policies support the development of a sound market and the business sector. In such a process, no particular group exercises dominance.

Project 13: Wildlife-friendly products: Linking community agricultural cooperatives to biodiversity conservation (Cambodia, Showcase 2008)

Wildlife extinction is caused by the increasing loss of wildlife habitat. Migratory birds are endangered not only by illegal poaching, but also the conversion of wetlands and forests to paddy land. The Wildlife Conservation Society (WCS) Cambodia has been carrying

out a project since 2009 called “The Promotion of Wildlife-Friendly Products (Ibis Rice Project),” in which farmers agree not to convert wetland and forests to paddy land, and the rice produced by the farmers who have signed such an agreement is certified as a “wildlife friendly” product. It was also widely acknowledged by local stakeholders that the avoidance of forest conversion would help reduce GHG emissions. The certification ensures that the products are not made through processes that harm the habitats of endangered wildlife or accelerate forest degradation. The certified rice is called “Ibis Rice” as rice farmers have made an agreement not to reclaim a forest habitat of wildlife particularly inhabited by ibis and other migratory birds. The farmers have to register and follow the rules set out by the farmers association in order to receive a certification for their products. Certified products have been sold in the market with environmental premiums of 10-30%, particularly due to the favourable response by tourism sectors such as hotels and local restaurants. Farmers and the tourism sector collaborate in conserving wildlife; farmers already receive higher revenue from the sales of certified rice, and the tourism sector expects to increase the number of tourists who are looking to observe unique birds in the communities.

Economic size

- The project is implemented in communities that are agrarian, produce a large volume of agriculture produce, and trade their produce and products to Siam Reap and Phnom Penh.

Conflict of stakeholder interest

- The main interests of farmers were to increase their revenue. By introducing certificate programmes that have created an environmental price premium with the support of the like-minded tourism sector, the farmers group has managed to increase their income without expanding their paddy land through the conversion of forests and wetlands. The certificate programme has helped stakeholders evade possible conflicts of interest.

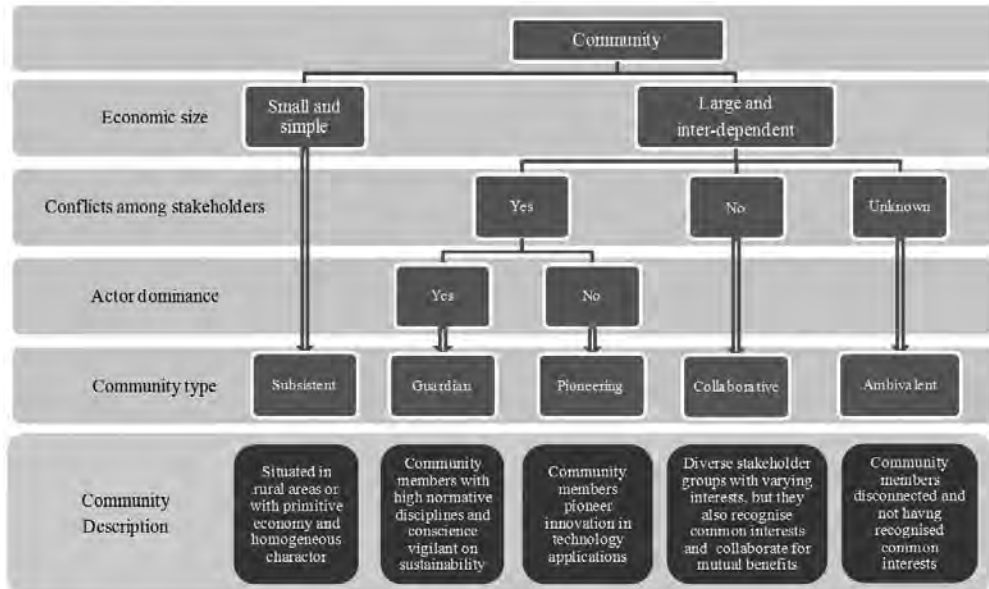
Actor dominance

- WCS has provided the concept of the certification labelling programme, as well as obtaining agreements with farmers not to convert wildlife habitat to paddy land. The concept was welcomed by local farmers, their associations and the tourist sector. In such a process, while WCS has taken a leading role, no dominant power was exercised by any of the stakeholder groups.

4. Community analysis

Based on the analytical framework presented in the preceding sections highlighting (i) economic size, (ii) conflict of stakeholder interests, and (iii) actor dominance, and the profiles of the selected 13 case studies, the communities presented in the case can be analysed as outlined in Figure 6.1.

Figure 6.1 Basis for community categorisation



Note: Economic size is assessed in relative terms, based on the overall size of economic activities taking place in respective communities.

Source: Author

To assist further analysis, the five categories in which the communities presented in the 13 case studies are classified as (1) subsistent, (2) guardian, (3) pioneering, (4) collaborative, and (5) ambivalent, as shown in Table 6.1

A “subsistent” community refers to a community that operates in a small size economy, and is socio-economically homogeneous in terms of occupation, income level, social status, religion and ethnicity. It is not difficult to form community agreement, but it is difficult to adapt to new technology.

A “guardian” community is one in which the majority of community members take a unified vigilant stance on sustainability issues despite the socio-economic conditions being rather diverse and complex, and can form a social force to confront and overcome conflicts of stakeholder interests, with a dominant power being exercised by conservationist/environmentalist groups. Not much extra effort is required to introduce sustainability policy measures as the society has already established socio-economic systems that can accommodate such policy measures.

In a “pioneering” community, members collaborate to overcome the conflict of stakeholder interests through mutual consensus and partnership building even if no stakeholder actor possesses sufficient power to dominate in sustainability policy decision making and implementation.

In a “collaborative” community, community members generally share sustainability policy values and do not necessarily have any stakeholder conflict. Under such circumstances, with the proper participatory consultation process, it is possible to introduce sustainability policy and activities.

In an “ambivalent” community, community members do not fully comprehend or share information on sustainability issues at the community level. For such reasons, the sustainability policy measures and activities remain within the realm of corporations and factories, and the communities do not play a role in raising the sustainability policy performance in a wider scope.

In the APFED programme evaluation processes, five factors have been identified as keys to the success of promoting sustainability, namely policy, markets, technology, information and stakeholder capacity level. In the following section, the operation of these five factors in five community types are analysed, and the correlation and interface between sustainability factors and community types are discussed.

Table 6.1 Community types

Projects	Economic Size	Stakeholder Conflicts	Actor Dominance	Community type
1. Jetropha Biofuel Project in Sri Lanka	Small	—	—	Subsistent
2. Micro-hydro Project in Indonesia	Small	—	—	Subsistent
3. Community Based Wind Energy System in the Philippines	Small	—	—	Subsistent
4. Supporting Sustianbale Sericulture Village in Nepal	Small	—	—	Subsistent
5. Capturing Methane Gas from Landfill site in Indonesia	Large	Yes	—	Pioneering
6. Enhancement of Eco-efficiency in Primary Industry in Thailand	Large	—	Unknown	Ambivalent
7. The Youth Leaders for Waste-Wise Communities in Fiji	Small	—	—	Subsistent
8. Promotion of 3R Concept for Waste Management in Nepal	Small	—	—	Subsistent
9. Straw Bale Insulation for Housing in China	Large	Yes	—	Pioneering
10. A Solid Waste Management as a Social Enterprise in the Philippines	Large	Yes	—	Pioneering
11. Wildlife Crime Hotline in Viet Nam	Large	Yes	Yes	Guardian
12. Pheromone Trap Use for Pest Control in Bangladesh	Large	Yes	—	Pioneering
13. Ibis Rice Project in Cambodia	Large	—	—	Collaborative

Note: Hyphenation—indicates No or negative.

Source: Author

5. Analysis on the correlation between community types and sustainability factors

Factors that have prompted a community to act collectively for its common interests are likely to fall under the following categories: (i) policy, (ii) finance, (iii) technology, (iv) local knowledge and (v) community empowerment. Accordingly, relations between community types and factor performance are examined below.

Through more articulated analysis of specific cases, the intention is to delineate conditions that will enable communities to act more like the “collaborative,” “subsistent” or “guardian” communities, and to move away from characteristics of “ambivalent” communities. The analysis also aims to highlight some key aspects to enhance

community cohesiveness, mobilise community support, and build partnerships toward achieving sustainable development through sustainable consumption activities.

5.1 Policy measures for transforming community functions and stakeholder interface

A commonality observed across all five categories of communities is that the nature of stakeholder-to-stakeholder interface can largely be modulated by policies. Therefore, without manifesting a consistent policy orientation, it is difficult for communities to unite and act toward common objectives. The command-and-control approach still seems to play an important role in mobilising people and stimulating innovation to improve environmental performance and the well-being of the community.

With the exception of the guardian community, policy measures tend to be embedded in the socio-economic conditions surrounding the community, and do not appear to be a major factor for successful implementation of activities to promote sustainable consumption. This is because many of the countries already have broad enabling policy frameworks in place and policy deficiencies were not noted as a limiting factor for project implementation.

In Project 1, a community received guidance on national policies to reduce reliance on fossil fuel and to explore renewable energy. While the government of Sri Lanka explores a broad set of climate change mitigation and adaptation options, it does not specifically guide actions on the substitution of fossil fuels. Therefore, an international NGO named Gurugoda has promoted experimentation with renewable energy in a rural community in northeast Sri Lanka by introducing a wind turbine for power generation. This was a basis for sensitising the community on the need to reduce reliance on fossil fuels and promote alternative renewable energy. In this way, the implementation of the Jatropa Biofuel Project was promoted.

The same observations apply to Project 2. While the Indonesian government formulates broad policies for promoting renewable energy to mitigate green house gas emissions, concrete actions have been pushed forward by the Indonesian Institute of Academy and Bogor Agricultural University, which developed schemes to reduce fossil fuel reliance and provide alternative renewable energy in the rural setting through the establishment of a micro hydro power plant.

In both Project 1 and 2, the community is classified as “subsistent” where members produce alternative energy and benefit directly from it. When stakeholders perceive direct benefits from their own actions, broad and general policy guidance can encourage them to participate in SCP.

However, broad policy guidance does not suffice when the community members are not *prima facie* direct beneficiaries of conservationist activities. In Project 11, it is not obvious that community members engaged in the wildlife hotline have received direct economic returns from their participation. Wildlife protection satisfies the aspiration of community members to halt the loss of wildlife, but they would not necessarily gain economic returns from the increase of tourists or remuneration for reporting illegal trading.

Policy measures need to be supported by proper awareness raising and capacity development that facilitates institutionalisation of collaborative activities to curtail unsustainable consumption and develop social vigilance.

5.2 Market development and economic viability

The importance of linkages between financial measures and community types is highly variable. When there are no significant conflicts between the members of the community (collaborative community), the community seems able to develop self-reliant, long term financing mechanisms. The probability of creating such financing mechanisms can be lower in an internally competitive community (pioneering community). The Landfill Site Methane Gas Capture Project in Indonesia, Project 5, can be an exception as it has been approved under the CDM although the returns from investing in community development have not yet been obtained. For the subsistent community, financing mechanisms remain under-developed. For a guardian community, policy measures have been observed to be more effective than financing mechanisms in changing practices.

Communities can be encouraged to pursue sustainable livelihoods not only through the installation of proper policies but also through the enhancement of market mechanisms and viability. Project 12 provides an interesting perspective. At first, farmers had the misconception that reduction of pesticide application would increase pest infection among their crops and reduce their profits. The suspected economic loss was prioritised over securing human health and ecosystem functions. However an experiment on the pheromone traps awakened the community to the fact that benefits from applying this trap as a substitute for conventional pesticides are much greater than the expected economic loss. With the introduction of insect sex pheromone traps, the proportion of marketable fruit to total production has risen and the production cost has dropped drastically. The demonstration of economic benefits arising from changing production patterns has convinced farmers in the community to switch to pheromone pest traps. The reduction or elimination of pesticide spraying has not only reduced the health risk for farmers, created savings and increased economic gains, but has also reduced detrimental impacts on ecosystems and health risks to consumers.

When enabling policies and market mechanisms operate in synergy, a greater impact can be expected. Project 13 has designed an agricultural cooperative so that farmers who agreed not to convert remaining forests to paddy land gain certification for their rice and access to a premium price market. In Cambodia, the government has been promoting forest and wildlife conservation but the enforcement of this policy has been limited by land tenure issues, inadequate monitoring, and lack of human capacity. Therefore, the design of cooperatives that is facilitated through Project 13 provides farmers with multiple and long term benefits. The cooperative identifies hotels and restaurants that are ready to pay an environmental premium for certified "Ibis Rice." The certificate shows the customers that this rice is produced by conservationist farmers, and the hotel supports such environmentally responsible activities. Without the presence of sensitised business operators who are willing to prioritise environmentally sound goods, the farmers' activities would not have succeeded. This multistakeholder partnership between farmers and business operators, along with the combination of macro-policies, market development and labelling schemes for habitat conservation, were vital to begin this positive cycle of sustainable rice production. The project has generated a great deal of environmental and socio-economic gains for the community, which has been classified here as a collaborative community.

5.3 Innovation in technology and local knowledge

A common feature shared between projects is that technology has played an important role in mobilising communities. The technologies used in the studied projects are not cutting-edge technology, but rather simple and low-cost for expedient application. When

the technology in question can multiply outputs at a marginal cost, communities tend to show enthusiasm in applying it. Good examples are Project 12 (pheromone traps) and Project 9 (straw bales). Substantive economic returns have been generated against comparably small investment. On the other hand, although renewable energy, particularly solar and micro-hydro (Project 2 and 4), are instrumental in pursuing sustainability, they are also costly and need longer redemption periods which tend to hinder investment from the communities.

In Project 12, pesticide dealers have been competing over client farmers and provide short term incentives to stick to conventional products despite the fact that community members are becoming increasingly conscious about their negative impacts on the environment. Openness or pioneering spirit must be capitalised upon in order to pursue innovative changes for better environment and well-being.

In Project 9, the straw bale compression technology was introduced by foreign engineers. Although this technology is neither complex nor cutting edge, it was absent in the project locality, and was instrumental in this project due to its reasonable cost and replicability. It is important to emphasise that the technology has generated tangible economic returns to those households that have adopted it, in a number of ways. First, compressed straw bales used as a substitute for bricks has reduced the housing construction cost by a quarter against the average total cost of RMB 20,000 per house. It has also reduced the use of coal for heating by 50-70%, and has generated savings of about RMB 2,100. Public funding was injected to start up this technology application. The local government has subsidised 30% of the construction cost, and the aid agency, in this case ADRA, has funded an additional 30%. The farmers or the house owner pay only 40% of the total cost which is RMB 8,000 and equivalent to 1.6 years of average annual income. The technology application is thus kept within the reach of ordinary farmers in terms of financing. It has addressed the public policy challenges that the local government had also identified as a priority for sustaining local socio-economic conditions. It is also worth noting that there has been a considerable creation of employment. Straw bale collectors, compressor operators and distributors of compressed straw bale insulation material are some of the newly created income generating opportunities. These socioeconomic factors prompted the acceptance and dissemination of the straw bale insulation technology. The right choice and application of technology, in terms of objectives, operational cost and manageability, have catalysed a positive response from community members and local governments.

Local knowledge is underlined as a key factor in applying and managing technologies. For Project 12, local farmers' knowledge of prevalent pest species and their behaviour helps the effective application of pheromone traps. In Project 9, Chinese villagers have been using straw bales for multiple purposes, but newly introduced technologies have provided an additional choice of usage, and enhanced the housing insulation efficiency.

In contrast to the aforementioned projects, Project 6 provides useful perspectives to understand the complexity and challenges in changing production and consumption patterns in developing countries from innovative projects. Thai business corporations are in general very proactive in addressing social concerns including the environment through corporate social responsibility (CSR) and community support activities. The activities spearheaded under this project primarily target the efficiency of energy and resource use in the manufacturing sector. One of the common methods promoted in the project is to replace obsolete power distributors in manufacturing plants. The power distributors monitor power consumption throughout operating hours in order to stabilise power use to the average standards without causing excessive fluctuation. The cost

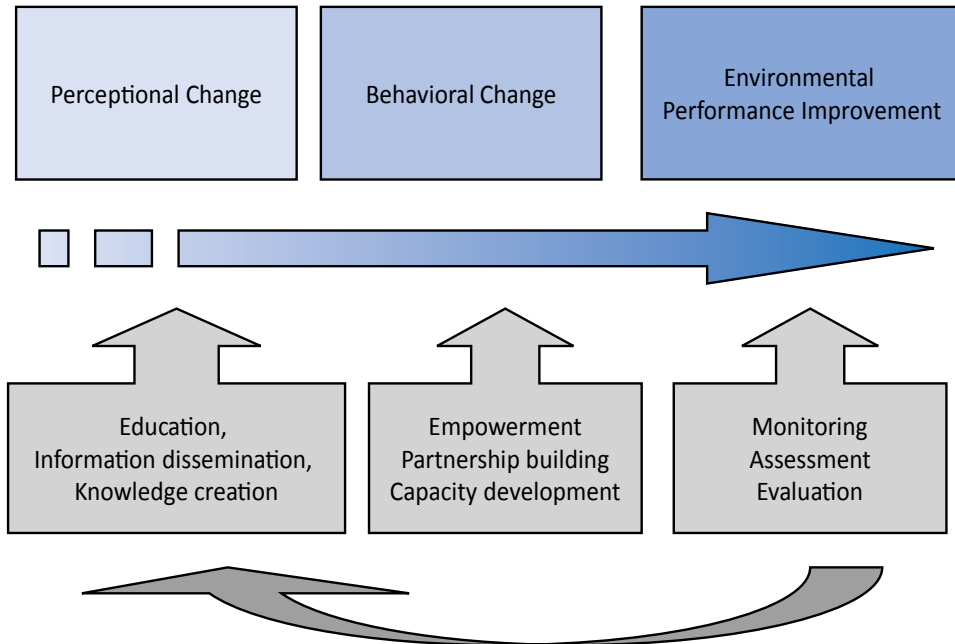
of advanced power distributors is redeemed in one to two years, and they bring about substantive economic returns. The installation of advanced power distributors is logical for proper plant resource management. Such advanced power distributors have been installed in a food processing company and underground oil tank manufacturer.

However, in an interview with the managers of the underground oil tank manufacturer, some problems were detected. Though OECD countries have already banned the use of single layered underground oil tanks due to the risk of oil leakage and soil contamination, the interviewed manufacturer still continues to produce the single layered underground oil tank for domestic supply. The government has already submitted a draft bill to ban single layered underground oil tanks but it has been pending over 10 years due to the recurrent government changes over the last decade and insufficient support from parliament members. It is not sufficiently linked with any particular public interest such as concern about environmental pollution or health hazards. Thus, the parliament does not consider this a priority for gaining public support and the public is not aware of the risks and economical disadvantages posed by the lack of regulation to ban single layered tanks and restrict underground tanks to triple layer tanks. Business corporations tend to focus on their own visible profit. Information is not shared with the public, so they remain ignorant of the risks. As it is not considered as a priority issue, no additional studies have been conducted on the risks imposed by the continuous use of the single layered oil tanks. Parliament members only chase after the issues by which they are certain to gain active support from voters in their constituencies. No single policy orientation emerges from the scattered interests of stakeholders, and the multistakeholder partnership is far from burgeoning. The state of the community resembles an ambivalent type of community.

5.4 Information dissemination and social capacity development

Knowledge and information sharing is imperative for facilitating policies and actions toward achieving sustainable development. All the cases described in preceding sections demonstrate the significance of the sharing and dissemination of knowledge and information as a first step for developing social capacity for sustainable development.

Questions remain as to what information is important and how such information should be shared among community members. People must know the meaning of invisible and creeping threats to the environment and to livelihood. It was significant in Project 12 that BARI has rebuffed the public concept that the more pesticides farmers apply, the lower the pest infection rate. Farmers were wondering whether the method of their pesticide application was a reason for increasing pest infection of their vegetable crops despite increased pesticide application. BARI conducted research on the relation between pest infection rates and pest control methods, and as a result, the myths surrounding pesticides were rebuffed. BARI communicated their research results to local farmers. Based on the information verified by this credible research institute, farmers found it easier to accept the assertion that reliance on pesticide applications and increasing its application do not necessarily reduce infection rates. Misleading perceptions need to be rectified by the presentation of reliable scientific findings. These findings need to be disseminated to promote perceptual and behavioural changes with a view to promoting SCP practices.

Figure 6.2 Continuum of empowerment for sustainability

Source: Author

In most of cases presented in the preceding sections, community members were given information and motivated to take actions or change their practices toward pursuing sustainability. In Project 11, Education for Nature, the organisation implementing the project, has set a strategy to undertake intensive awareness raising and outreach campaigns against the illegal wildlife market. In Project 9, the project implementers have conducted a series of training sessions for community members for straw-bale housing. In Project 13, the Wildlife Conservation Society has conducted training programmes on the form of adequate agriculture without hampering local biodiversity. Training and information dissemination are open-ended, inclusive and participatory for all interested community members.

The cycle of information provision is geared toward changing community members' perceptions as shown in Figure 6.2. With training and provision of technical assistance, community members are empowered to undertake activities conducive to achieving sustainability and ameliorating environmental impacts. Some community members undertake self-monitoring and regulation, and share information on the outcome of their monitoring and evaluation to urge community members to strive to achieve better environmental performance.

In contrast, the training conducted for Project 6 is more technical and business oriented in nature. Thus, it is exclusive to engineers and plant managers, and the issues are not necessarily shared beyond this group. Such a lack of interface with local communities adjacent to the plants makes it difficult to raise the profile of eco-efficiency issues as a public agenda item, and the technology upgrading at the plant level does not lead to policy transformation at the macro-level.

5.5 Sensitising community members and stimulating the movement beyond community

Community/stakeholder empowerment is considered the key factor across all the projects and community types. Most communities had undergone capacity development activities, and community members had acquired sufficient knowledge regarding the need to change their conventional practices. Such communities have formal and/or informal decision making processes and the modalities of decision making or governance structures have been observed not to be critical for the success of their activities as long as the community members are able to participate in such processes or their views are distilled and included in the decision-making.

Project 6 was an exception for sensitising the community. The project itself has been very successful in enhancing energy efficiency in the participating business entities and factories. However, some factories involved in the project continue to produce single layer underground oil tanks which have shorter durability (a 10-year warranty) compared to three layer tanks (30 years). As the single layer tank has a higher risk of oil leakage, OECD countries have banned its use. The government prepared a draft law banning it about 10 years ago, but it has not yet been adopted by the Parliament. The community is not informed of such policy deficiencies nor of the production of environmentally unsustainable products. Due to limited information disclosure and public awareness, neither the factory nor the community has acted towards changing business practices to promote SCP.

There are a number of projects that address SCP issues under the APFED Award or Showcase Programme that are not described in the preceding sections. This is because their activity impacts are oriented to waste management and composting of biodegradable wastes rather than to directly targeting the promotion of sustainable consumption, or targeting stakeholders that extend beyond a particular community. Yet, such cases have many common features with the cases presented in the preceding sections.

As described in case study analyses, a number of projects address the 3Rs, and some of these projects have the promotion of biodegradable waste composting as a common feature. In Project 8, people mobilised by the NGO, MARDO, have been engaged in activities to reduce waste generation. In their project, biodegradable waste composting is used to generate organic fertiliser that can be sold and thereby enable people to obtain extra income. In Project 7, in addition to biodegradable waste composting, a campaign to refuse the use of disposable plastic shopping bags and to encourage people to carry reusable shopping bags is also influencing people's perceptions. Biodegradable waste composting and the shopping bag campaign may not necessarily have a significant impact on promoting sustainable consumption directly. However, they have been proven to have a significant impact on changing people's perceptions toward promoting sustainable consumption. It is worth considering integrating biodegradable waste composting and shopping bag campaigns in awareness raising and capacity development activities aimed at promoting sustainable consumption.

There are two other projects that promote biodegradable composting: Project 5 and Project 10. These projects are more centralised systems of composting and are quite different from composting at the household level. A major difference is that in household composting, community members receive direct economic returns from the sale of organic materials obtained from composting, while in the case of centralised composting, community members do not necessarily receive direct economic returns. However, in Project 5, the project organiser, PT Gikoko, has not succeeded in obtaining carbon

revenue from the sales of certified emission reductions under the CDM of the Kyoto Protocol to the UNFCCC. PT Gikoko has pledged to return 7% of carbon revenue for investment in community development and social safeguarding of the poor. In Project 10, it is not the Bago city citizens that manage the organic materials produced from composted organic wastes, but the Bago city authorities that manage such materials. It can be said that the citizens benefit from the centralised organic waste collection and composting systems from the reduced cost of waste management and better use of organic materials for parks and farms. However, there is no direct cash payment to the citizens of the city.

The three case studies in Nepal (Project 8), Fiji (Project 7), and the Philippines (Project 10) have a strong component of awareness raising and training regarding the segregation of degradable and non-degradable waste for effective composting. Project 5 does not integrate such awareness raising and training components in their project activities. This difference in approach seems to emanate from the difference in opinion of the leader and entrepreneur as to whether a high content of biodegradable wastes make it possible to collect methane more effectively. Centralised composting with strong awareness raising and training and the reinvestment of revenue in community development would provide higher incentives for community members to act collaboratively to achieve sustainability.

6. Recommendations

By narrowing the scope of our examination to the stakeholder interface and factor performance at the community level, this paper analysed a variety of community actions aimed at promoting renewable energy, energy efficiency and wildlife and ecosystem friendly consumption at the community level. Through the analysis of community types, a set of recommendations has been drawn with a view to mobilising communities to promote change towards sustainable consumption. These recommendations are described below.

6.1 Assessing community characteristics

When a community is at the stage of not having a formal or informal organisation to undertake communal activities, application of simple and low cost technology at the household or a level of a small community fraction has a high probability of producing an effective project (Projects 1 to 8). With such a household or sub-communal approach, it can be made clearer that participating households and sub-communal groups benefit directly from the project. It is seen as a key to provide communities with proper incentives for undertaking collective action. It can be said that in a subsistent community, a decentralised incentive driven system works well.

When the community has already developed formal or informal systems aimed at achieving the members' common objectives, market-based mechanisms will spur the application of technologies and prompt behavioural changes toward achieving sustainable consumption. Examples include Projects 5 and 12. In communities where conflicts of interest were detected (pioneering communities), such conflicts were overcome by the demonstration of tangible benefits such as higher yields and savings. In communities where conflicts of interest were not identified, members moved swiftly toward establishing systems to achieve common objectives (establishing labelling schemes for wildlife friendly products or centralised engineering composting plants). In organised communities, members undertake collective actions that achieve higher resource efficiency and improvement in environmental impacts.

In designing programmes to promote sustainable consumption at the community level, it is thus important to assess the dimension of stakeholders and their relations. This assessment will enable more suitable decision making on approaches to mobilising communities toward achieving sustainable consumption.

6.2 Enhancing policy and economic incentives through governance and information

No case was observed where successful field activities have directly prompted macro-policy and institutional transformation towards the creation of enabling policies to achieve the goal of sustainable consumption. In the cases analysed, each community had their own unique decision making and management structures. Therefore, it is important to acknowledge the characteristics of community in governing communal matters particularly when interest conflicts are observed in the community.

For Project 9, various governance structures are in place at the village, district and provincial levels. The provincial government banned brick production and promoted the use of straw bales in order to reduce the use of kerosene. The success of the project has more to do with the continuous interaction between the local government and community members. Community members understood that the continuous reliance on bricks exacerbates land degradation, land use conflicts over mining sites and farm land, household air pollution, and respiratory disorders. Community members who applied straw bales as insulation material in housing have successfully demonstrated savings from reduced demand for kerosene to heat their houses, and have used a part of these savings to invest in greenhouse vegetable cultivation.

Similarly in Project 12, pesticide distributors were considered potential opponents to the promotion of pheromone traps for pest management. However, agricultural advisors of the local agriculture association and BARI have interacted intensively with community members on the benefits of stopping the use of agrochemicals and applying pheromone traps as a means of pest management. Farmers were convinced of the merits of this strategy when they obtained higher yields from lower pest infection and savings from not purchasing agrochemicals.

With Project 5, the situation is a little more complex. It has been observed that the community is segregated in two groups, namely the village farmers who have resided there for generations, and the scavengers who are a minority and are immigrants from conflict prone areas of the country. With the agreement to invest revenues from CERs or carbon credits into community development projects such as the construction of clinics and of public housing, there emerged broad support from the community for this project. Yet for various reasons these plans for community investment have not yet been implemented. One of the impeding elements is the fact that the CERs have not yet been sold in the market, so the engineering company has yet to receive any revenue. Secondly, there is a plan to convert heat gained from methane combustion into electricity. However, as the cost of electricity is kept very low as a social safety net, there is no hope of recouping investment costs through marketing electricity locally generated from methane combustion. In addition, the Indonesian national electricity company (PLN) controls the electricity market including the electricity grid, and the suggested charges for using the PLN's grid is considered very high. For these reasons, although the community can be said to have come to a considerable level of interest convergence, they still have a way to go before the planned actions to share proceeds from CDM in promoting social development in the community materialise.

The project activities have demonstrated benefits of changing policies toward achieving sustainability through, for example, using biomass insulation material, applying integrated pest management or using renewable energy sources. However, the interface needs to be stimulated much more proactively between field levels and macro-policy levels to prompt policy and institutional transformation.

6.3 Promoting community openness and external facilitation through environmentally sound practice and technology

In the communities that are open to external facilitators, positive outcomes are observed in applying environmentally sound technology and practices. For example, Project 1 has been undertaken in a community that was quite unique in its openness to accepting jatropha, an alien, toxic, and non-edible, but oil generating plant proposed by an external NGO. The community intends to introduce biofuel as a substitution for gasoline in consumption while it also strives to increase biofuel production at the community level. In Project 9, the community was influenced by the external facilitators to introduce a new technique to use straw bales—agricultural residues locally available as insulation material.

The openness of communities to external facilitators is a part of the prerequisite for successful implementation of various projects reviewed in the case studies. However, it is not that the community members blindly accept suggestions from external facilitators. They assess the merits and requirements of policy options suggested by external facilitators. National and foreign facilitators are also cautioned not to impose pre-conceived project concepts without understanding community conditions. Wise collaboration with external facilitators is a prevalent factor in the case studies. The community must have developed a capacity to assess suggested propositions from external facilitators and adjust them sufficiently in the local context.

The application of environmentally sound practice and technology is embedded in many of the successful undertakings aimed at enhancing resource use efficiency. In Project 12 in Bangladesh, the pheromone traps for pest control were introduced through a programme funded by the Department for International Development (DFID) of the United Kingdom. Methane gas collection systems for Project 5 in Indonesia were introduced by a local engineering company, but managed with expertise provided by Australian volunteers. Machinery for compressing straw in the straw-bale insulation project in Project 9 in China was introduced by a research centre affiliated with a Swedish university.

Community members and stakeholders have interacted with external agents and supporters in regard to the potential of new technologies. The acceptance of the technologies is considered to depend on the people's assessment of the benefits to be brought by the technologies vis-à-vis other requirements such as possible social adjustments. Communities and external facilitators have chosen technologies that are low in cost, simple and expedient. None of the communities have chosen to introduce high or costly technology that often goes beyond their managerial capacity.

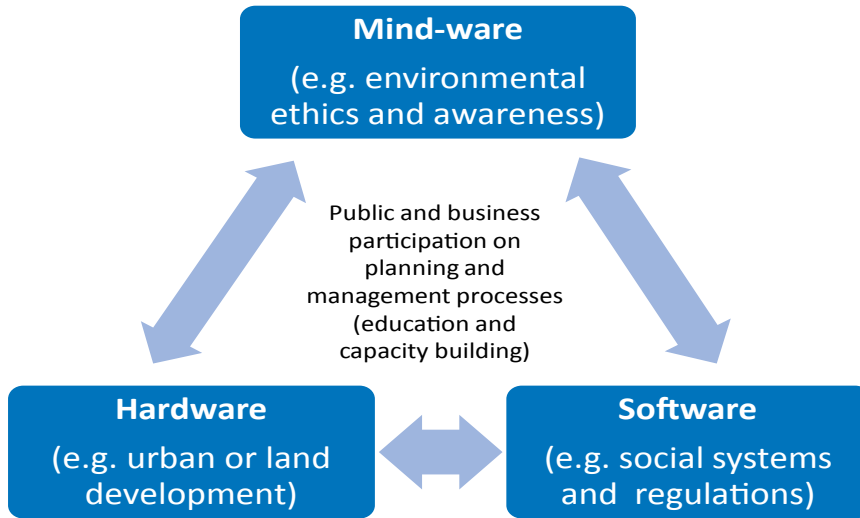
What looks quite significant in pioneering or collaborative communities is that they are open to innovative actions. They are given information and are involved in the consultations over the problems they face. It has also been observed that these communities have different levels of response to problems that present themselves. Some communities are indifferent while others are eager to introduce changes in order to tackle problems. These differences apparently stem from various factors such as

the level of economic prosperity and the level of understanding of the problems. It may be presumed that it would be easier to influence community members and change perceptions in subsistent communities. The subsistent community can be said to have a higher inclination to adhere to conventional values and practices and be less open to external facilitators who try to introduce new technologies and practices. To influence a subsistent community, mutual confidence needs to be established through continuous interaction and consultation.

6.4 Reinforcing policies and institutional framework through mind-ware

As stated earlier, reinforcing policies and institutional frameworks are vital for community mobilisation and successful implementation of programmes and policies. Broad enabling policies are embedded behind all the case studies presented in this chapter. However, it was the communities themselves that needed to take concrete steps to create more detailed programmes and systems and to establish supporting institutional mechanisms. Little influence of macro-policy was observed in the project implementation of Project 1 and 2. The Pheromone Trap Use for Pest Control Project (Project 12) does not have clear policy guidance on the use of pesticides. Yet, through the sharing of information on problems and benefits resulting from proposed prescriptive actions, the communities have made decisions to abandon or at least minimise conventional practice, and to have recourse to new practices and technologies. It is certainly best that the enabling policies be in place in a timely manner for the community to take collective action. However, our empirical studies show that the communities can still take collective actions in the absence of sufficient enabling policies if the community members are given proper information in a timely manner and share a common assessment of the problems and benefits of proposed actions.

It is a task of policy makers and probably also of research institutes that field level lessons be capitalised upon to facilitate macro-policy and institutional transformation. There is so far little evidence that shows that field level action has catalysed macro-policy and institutional transformation. This does not mean that there is no such linkage. Organisations implementing projects publicise their activities and the local and national newspapers carry coverage of innovative community activities. However there is a gap between the field actions and macro-policy decision making process. Feedback from the field to macro-policy decision making does not take place automatically. At present, there is a need for external and deliberate interventions to generate effective field actions towards the macro-policy. Research institutes, NGOs and other relevant stakeholder groups must document their successes, relate them to policy gaps and recommendations, and provide decision makers with inputs to facilitate macro-policy and institutional transformation with a view to enhancing their appropriateness and effectiveness. APFED, which integrates field action, case study analysis and policy dialogue, offers a useful international collaborative framework to link field actions with macro-policy and institutional transformation.

Figure 6.3 Area of environmental planning and management

Source: developed from Harashina (2009)

Overall, as Harashina (2009) describes, an adequate balance between “hardware,” “software,” and “mind-ware” is one of the most important things in order to successfully implement environmental projects (Figure 6.3). Hardware is defined as physical substances such as infrastructure, which require capital/investment/financial sources. Software is constituted by rules and regulations that relate to authority. Finally, mind-ware is the heart of the community that has awareness on environmental issues. Many projects have been successful because the mind-ware of communities was enhanced through capacity building, training and other awareness raising programmes. These activities are the core of public and business participation in project implementation, which are essential for successfully implementing the project in the long term with strong community support.

6.5 Facilitating multistakeholder partnership to amplify impacts and safeguard community from risks

Multistakeholder partnership is another important factor to encourage communities toward effective project implementation. In collaborative communities, multistakeholder partnerships have emerged swiftly. In pioneering communities, it takes a while to sort out communal conflicts. However, after communities have reached agreement on positions over the problems presented and proposed actions, they were also prompt in forming multistakeholder partnerships.

What should be underlined is that the communities were able to create new agencies if they encountered the need to do so. In Project 13, an association of conservationist farmers was established and started giving certification to wildlife friendly products. In Project 12, several companies were established to produce pheromone essence and containers for this. New engineering companies have been created to market and install straw bale as insulation material in Project 9. Successful multistakeholder partnerships are therefore not limited to existing stakeholder groups and agencies, but also to newly created business entities.

It was observed that to allow the creation of new entities and actors, governmental procedures should not be an impediment. In the countries where the presented projects have been implemented, there are standard procedures to register new companies. However, many of them have not encountered barriers to become operational swiftly. One of the reasons for their successful registration under national law and their entry into the market was a sound technical capacity to perform the intended operations.

It must be noted that the communities did not opt for a monopoly by the newly created business entities. In Project 12, there were deliberate attempts to create a number of companies to produce pheromone essence and tablets. By establishing three companies to operate in the same market, efforts to curtail monopoly were considered successful. Partnership does not grant monopolistic power to a newly created company. The stakeholders that need to work in partnership with the newly created business entity need to be vigilant regarding potential domination by such an entity in the market, and it is advisable to create a plural number of business entities to create a healthy competitive market.

6.6 Integrating community into actions to drive policies

As discussed in the preceding sections, communities have great potential for taking the lead in demonstrating innovative actions that can lead to macro-policy and institutional transformation. It is often the case that the macro-policy dialogues stall due to complex conflicts of interest and uncertainty over the outcome of suggested policies. However, by undertaking concrete action at the community level, people can observe tangible achievements and challenges that emerge through practical activities. As sustainability policy measures involve multi-faceted environmental and socio-economic issues, it is never simple to draw conclusions through abstract policy discourse. It is important to assess the characteristics and dynamism of communities, and bridge the gap between the field and macro-policy discourse. The challenge is how to replicate successful practices in other areas and countries while meeting conditions peculiar to the particular community or country. Systems that multiply effective environmental projects need to be developed and installed at a certain stage to upgrade successful practices. To realise the multiplication of successful practices, it is vital that programmes aimed at such replication across regions be developed and expanded as the regional and international collaborative programmes, and regional and international institutions are given opportunities to play a facilitating role in such a replication process in collaboration with national and local partners. It is hoped that such mechanisms will emerge in the immediate future with the concerted efforts of likeminded stakeholders and partners aimed at achieving a sustainable society in Asia and the world.

7. Conclusion

Through the analysis of the APFED case studies, it is clear that there are various factors that prompt communities to act collectively for promoting sustainable consumption. Those factors are policy, finance, technology, local knowledge, and community empowerment. The application of these factors needs to be balanced. Without such a balance, the capacity of the community to act collectively could be hampered. For example, policy can be ineffective if there is a lack of community empowerment. No matter how the community is categorised, it is clear that all projects were more successful under the combination and balance of these factors.

Activities for community empowerment and for the introduction of technology especially played an important role in general, although with variations in degree according

to community type. Though these trends were not always consistent, this type of analysis turned out to be useful for objectively understanding the characteristics of each community and examining effective approaches in the respective communities. Therefore, this type of analysis needs to be further developed by applying it to more case studies for the data to be more significant.

Examining the presented projects and analysing the co-relation between community types and sustainability factors, seven recommendations were derived as a means to realise effective community action for influencing macro-policy and institutional transformation to promote SPC. Those are recapitulated as follows:

- (1) Assessing community's characteristics
- (2) Enhancing policy and economic incentive through governance and information
- (3) Promoting community openness and external facilitation through environmentally sound practice and technology
- (4) Reinforcing policies and institutional framework through mind-ware
- (5) Facilitating multistakeholder partnerships to reduce the creation of monopolies
- (6) Integrating community to drive policies into real practices

These recommendations need to be implemented carefully with a clear understanding of the characteristics of the community. The form of application also needs to be tailored based on the varying conditions peculiar to each community as there is no single solution to the problem of promoting sustainable development. The integration of multistakeholders, multi-sectors, and multi-disciplines is indeed important for guiding comprehensive outcomes. In addition, continual monitoring and evaluation processes must be conducted to make the outcome more holistic and sustainable.

Overall, It is hoped that the conceptual framework of community characteristic analysis and its co-relation with policy factor performance provides useful perspectives in designing activities to lead communities toward SCP in both Asia- Pacific and worldwide. However, these processes must be further developed through the enrichment of further empirical studies and applications for more effective and pragmatic use in planning and implementing policies and community actions toward SCP.

Notes

1. With assistance from Izumi Tsurita, Sana Okayasu, Ikuyo Kikusawa, Emi Doi, and Aya Watarai.
2. The Asia-Pacific Forum for Environment and Development (APFED) was established in 2001 as an Asia-Pacific regional group of eminent experts on sustainability policies. In phase two (APFED II), (i) multi-stakeholder policy dialogue (Policy Dialogue), (ii) good practice award programme and database management (Knowledge Initiative) , and (iii) pilot project and research support (Showcase) have been promoted as three pillars with the institutional support of the Asia-Pacific Network of Policy Research Institutes for Environmental Management and Sustainable Development (NetRes). IGES operates as secretariats for APFED and NetRes. Details can be found at: www.apfed.net
3. Cohen (1985), on the other hand, has proposed a more simple definition of community as a form of society where one learns to be social outside the context of home or kinship.
4. The earthquake shock absorption was acknowledged in laboratory tests, but has not been tested during an actual earthquake.

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Section III

Focus on Natural Resource Use

This section features a number of topics drawn from sustainability issues and lifestyles in relation to our use of natural resources. From extraction, processing and transportation methods, to equitable use, quality issues, and shifting responsibilities in a resource constrained world, this section provides unique insights through case studies and rigorous analysis to develop highly original contributions to the policy-oriented literature on natural resources and SCP in the Asia-Pacific region.

The objective of the first chapter in the natural resources section is to use case studies to show how economic instruments, in combination with other methods, can promote sustainable consumption of fresh water. These case studies in Chapter 7 show unique approaches to minimising water waste; maximising water use efficiency; maximising water availability by limiting the degradation of water supplies; optimising water allocation to competing users, including the environment; and limiting access to sustainable levels. Various approaches are shown including municipal water supply charges in Singapore and Cambodia; water charges in Thailand; water trading schemes in Australia and China; and an integrated approach to water management for pricing in Japan. These cases also show that economic instruments are not the only option for promoting sustainable water consumption. Complementary measures can facilitate adequate water supply and sustainable consumption – such as mandatory installation of water saving devices as in the case of Singapore, or simply improving water supply services as in the Cambodian case.

Chapter 8 on conserving tropical forests explains SCP in their context by providing an excellent definition for sustainable consumption and production of forest products, followed by insights into how consumer choices and options available to producers can have compounding effects on sustainability. Whether it is a wooden table, a house constructed with wooden framing, a ream of paper, or a bar of soap made with palm oil, remote consumer decisions send signals to forest and land managers that impact the health of forest ecosystems. When consumer choices for products containing wood materials are not informed or governed by sustainability concerns, the signal to forest managers, traders, manufacturers, house builders, retailers and others who use and handle wood materials is that they can continue with their current practices, no matter how environmentally destructive some of these might be. The authors point out that while it is tempting to draw quick conclusions about what types of policy are needed, they argue that deeper consideration reveals that policy implementation may not be so straightforward and that in some cases it could lead to unintended outcomes. This chapter reviews a range of innovative approaches—voluntary sustainability certification schemes, procurement policies, consumer awareness campaigns, and legislation banning the import of illegal timber or requiring checks on

legality by importers—that have potential to lead towards a more sustainable tropical forest products trade.

Chapter 9 explores how renewable energy and energy efficiency have the potential to address serious concerns on energy security, energy access in rural areas and climate change. While finding more fossil fuel reserves may solve some problems temporarily, it really should be a matter of harnessing the alternatives and consuming less through lifestyle changes and innovation. While most countries in Asia are dependent on imports of fossil fuels, almost every country has potential large-scale renewable energy sources to exploit. However, the current share of renewable energy remains so low that it will not significantly reverse the environmental and security risks associated with consumption of fossil fuels if the situation remains unchanged, and unchallenged.

This chapter emphasises the need to rapidly increase the share of renewable energy and offers a mix of policy recommendation. And while these recommendations are mainly top-down renewable energy technologies of course need consumers to demand its product—which is sustainably produced electricity—and to drive innovation on how it can be more efficiently produced and consumed. Finally this chapter implores all consumers to adopt lifestyle changes which lead to reduced energy consumption and supports pathways to low-carbon energy utilisation.

The final chapter in this section on natural resource use focuses on food safety issues with emphasis on identifying ways to address current food safety issues in policy and practice in the Asia-Pacific region. Food safety in this context refers to the production, distribution, and demand for food and, in particular, how certain inputs such as chemical fertilisers and pesticides affect food quality and quantity. And while organic agriculture seeks to provide freedom from using chemical inputs and food free from harmful levels of chemicals, to date organic agriculture is essentially limited to niche markets due to issues related to scaling up and prices which keeps consumer demand from reaching a significant groundswell. This chapter explores the need to look at various means of achieving food safety, while simultaneously addressing issues in organic agriculture, so that all people can have access to safe food at affordable prices. A two-pronged strategy is suggested in this chapter to promote food safety in the region: to promote organic agriculture and continuing to promote general food safety practices across all forms of food.

Chapter 7

Promoting Wise Use of Water:
Application of economic instruments

Chapter 7

Promoting Wise Use of Water: Application of economic instruments

Yatsuka Kataoka and Sangam Shrestha

1. Introduction

Global water consumption has doubled every 20 years along with population growth, urbanisation and expanding economic activities and this increase has resulted in intensified pressure on water resources. The world is also facing the dilemma of the lack of access by the poor to safe water drinking water. There are 884 million people, or 13% of the world population, who do not have access to safe drinking water (WHO and UNICEF 2010). If the current trends of water demand continue, water shortages will become even more intense—approximately half of world's population will suffer from high water scarcity in 2030 (UNESCO-WWAP 2009). Coupled with this, climate change has emerged as a driving force in increasing stresses on water resources by changing the physical condition of water resources and water consumption patterns, which could account for about 20% of the increase in global water scarcity (UNESCO-WWAP 2003).

Historically, people coped with water shortage problems by developing water storage facilities and supplying more water. However, development of new water sources¹ is not economically or environmentally feasible in many cases.

Moreover, water is a finite resource and therefore it is necessary to promote sustainable consumption to address water stress rather than strengthening water supplies. Sustainable consumption has been explained in chapter 1 of this White Paper, and in this chapter, sustainable water consumption is defined as follows:

Chapter Highlights

Water stress is a critical issue globally, in particular in developing Asia, where many people live without access to safe water. In addition to long-standing socio-economic factors such as population growth, climate change has intensified concerns over water stress. This chapter addresses the following points in the discussion on promoting sustainable water usage, in particular by using economic instruments as policy tools.

- To cope with the escalating water stress, sustainable water consumption in all water use should be promoted rather than focusing on new water development.
- Cases in which economic instruments (EI) are applied in Asian countries show that EI alone cannot promote sustainable consumption.
- EI does not automatically prevent the poor from accessing safe water, but it is a necessary instrument in providing them with appropriate financial support such as subsidised connection costs.
- To apply water pricing effectively, clear water use rights, proper metering systems, and improved credibility of water supply services (e.g., stable supply hours, quality of water supplied) are examples that make EI workable.
- Current sectoral management is a barrier to reflecting the true economic value of water. The concept of integrated water resources management should be promoted.

- minimising wasteful water use in all sectors, while meeting basic human needs;
- maximising water productivity in agricultural and industrial production;
- minimising the direct environmental burden while using water;
- fostering economically efficient allocation of water—giving priority of water use to higher value uses, but with due consideration of environmental and social impacts caused by reallocation of water uses.

There are various ways to change water consumption behaviour, such as laws and regulations, education and communication campaigns. Among these, economic instruments, such as water charges and taxes, are considered to be one of the most effective tools in promoting water saving practices. They are also recognised as useful tools for cost recovery of water services, rendering it more sustainable. These economic tools can be more efficient than command and control type of regulations and give users more flexibility to adapt. However, there are various barriers to the implementation of economic instruments such as users' unwillingness to pay and undefined water user rights. In addition, there is a suspicion that the introduction of economic instruments may increase the cost of water and keep the poor from accessing safe water supplies.

Recognising the importance of, and concerns regarding, economic instruments, this chapter examines some practical cases of applying economic instruments to determine the dominant factors for success and failure. Through the lessons learned from these cases, some suggestions for effective application of economic instruments and their role in promoting sustainable consumption of water resources are drawn.

2. Freshwater resource availability and trends of water demand in Asia

2.1 Freshwater availability

In Asia, some 60% of the global population depends on 36% of the water available on Earth (WWAP 2003). Many countries in the region are already suffering moderate to severe water stress² as shown in the following table (WWF 2008). Population growth is considered to be a driving force which intensifies water stress.

Table 7.1 Countries in Asia and the Pacific with moderate to severe water stress

Moderate water stress (20–40%)	China (20.07%), India (33.39%), Japan (20.61%), Republic of Korea (26.09%), Sri Lanka (24.74%), Thailand (20.65%), Kazakhstan (31.79%)
Severe water stress (more than 40%)	Pakistan (75.5%), Uzbekistan (115.44%), Turkmenistan (99.46%)

Source: WWF 2008

In addition to population growth, climate change is considered to be a factor in the availability of water in the region. Compounding effects will accumulate due to climate change, population growth, and increasing demand as a result of higher living standards which will result in a decrease of water availability over the next few decades in the large river basins in the region (IFAD 2009). This echoes the sentiment expressed in the opening chapter of this White Paper—as success is seen in poverty alleviation and living conditions improve, attention must be paid to what path these improved lifestyles will take. Will they develop sustainably or will they compound the challenges presented by global climate change by increasing populations in areas already under severe water stress, thereby presenting even greater challenges for all levels of society, including

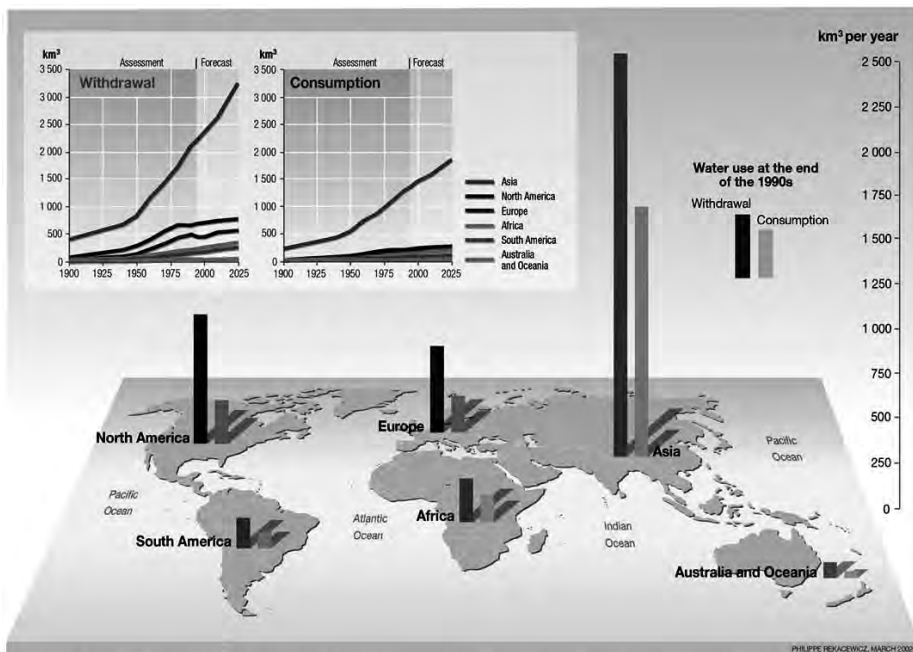
those still in poverty? With proper coordination and a policy mix appropriate to the context as described in this chapter and the rest of the paper, sustainable water consumption may be an achievable reality.

2.2 Water consumption trends

In terms of consumption, Asia accounts for the most water consumption in the world (Figure 7.1). In 2000, about 57% of the world's freshwater withdrawal and 70% of its consumption took place in Asia (UNEP 2002). According to the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), water resources in the region are being unsustainably extracted—annual water withdrawal in countries such as Uzbekistan and Azerbaijan has already exceeded the renewable water available; India, Pakistan and Sri Lanka have experienced a rapid increase in water extraction; and the speed of water extraction in China was exceptionally high compared to rates in the late 1980s and early 1990s, which may be driving them to the tipping point faster than previously forecasted (2008).

On the other hand, as Figure 7.1 shows, Asia also has the largest gap between withdrawal and consumption of water (UNEP 2008). This means that the region has high potential to save water by promoting sustainable consumption.

Figure 7.1 Global water withdrawal and consumption



Source: Igor A. Shiklomanov, State Hydrological Institute (SHI, St. Petersburg) and United Nations Educational, Scientific and Cultural Organisation (UNESCO, Paris), 1999; *World Resources 2000-2001, People and Ecosystems: The Fraying Web of Life*, World Resources Institute (WRI), Washington DC, 2000; Paul Harrison and Fred Pearce, *AAAS Atlas of Population 2001*, American Association for the Advancement of Science, University of California Press, Berkeley.

Source: UNEP 2008

Agricultural water demand

Water usage in Asia and the Pacific is primarily for agriculture, accounting for 79.2% of total withdrawals in 2002 compared to 13.1% for industrial use and just 7.7% for

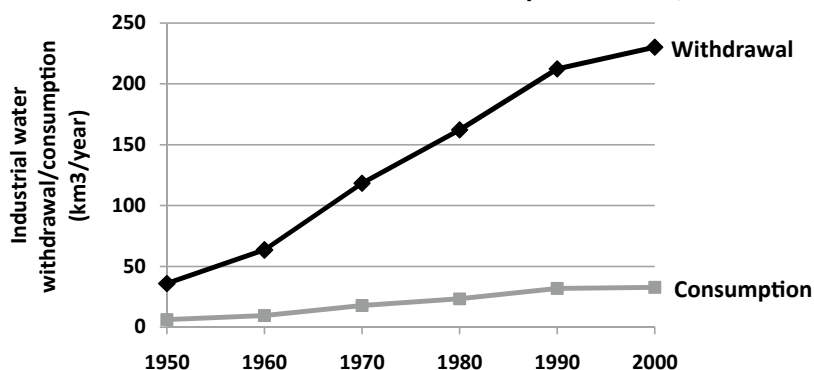
domestic use (UNESCAP 2008, 197). However the majority of irrigation systems are inefficient which results in significant water wastage (Revenga 2000). In addition to inefficient irrigation techniques, the low price of agricultural water, which is often due to subsidies, is considered a factor which sustains inefficient use and does not encourage adopting water-saving technology such as drip irrigation (*ibid*).

Industrial water demand

After agriculture, the industrial sector is the second largest water user in the region. Industrial water use is increasing in many countries of Asia and the Pacific due to rapid economic growth. Between 1992 and 2002, China and Viet Nam more than tripled their industrial water use; while in Asia-Pacific in 2002 the average share of water withdrawal for industry was 13.1% (UNESCAP 2008). Except for a few countries in North and Central Asia where the share has fallen slightly, the proportion of water withdrawal by industry is rising in all sub-regions (*ibid*).

There are large gaps between water withdrawal and consumption in the industrial sector (Figure 7.2). It is worth encouraging effective consumption of water in the industrial sector by introducing water saving technologies and changes in production processes.

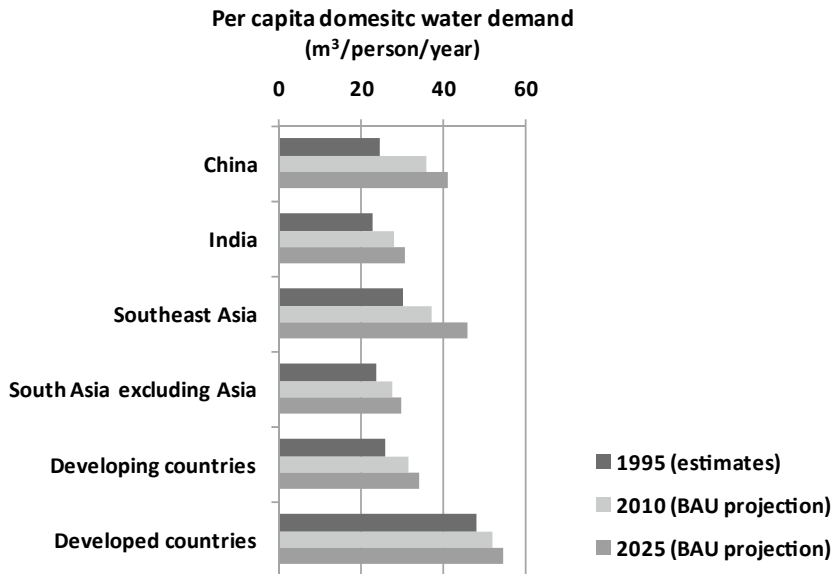
Figure 7.2 Industrial water withdrawal and consumption in Asia, 1950-2000



Source: UNESCO-WWAP 2006

Domestic water demand

Household water consumption in Asia is rising rapidly due to population growth, urbanisation and increase in living standards. By 2025, as shown in Figure 7.3, the per capita domestic water demand is projected to increase significantly.

Figure 7.3 Increase of per capita domestic water demand in Asia³

Source: Based on Rosegrant et al. 2002

Domestic water demand varies greatly according to location, climate, and socio-economic variables and is often found in the economic literature on the subject to be related to such factors as family size, quantity of water-using appliances, income and weather, with water use having an inverse relationship with rainfall and a direct relationship with temperature increases. (PRI Project 2004).

As for gross water consumption, it is worth addressing the increase of bottled water consumption. Three of the top consuming countries in the world are in Asia; with compound annual growth rates (CAGR) of 15.6% for bottled water consumption in China between 2003 and 2008 and 5.2 billion gallons of bottled water consumed in that same time period, Chinese bottled water consumption added up to 9.9% of total global industry volume (Rodwan 2008, 16).

In terms of resource efficiency, bottled water consumption is not a sustainable solution to water stress due to the energy used and resulting emissions, in addition to the amount of water used to produce a bottle of water being greater than the amount contained within the actual bottle. According to the Pacific Institute's study on bottled water consumption in the U.S., it takes three litres of water to produce one litre of bottled water. In terms of energy consumption, production of the plastic bottles for bottled water consumed in the U.S. in 2006 consumed the equivalent of more than 17 million barrels of oil, while bottling the water resulted in 2.5 million tons of carbon dioxide emissions, not including transportation (Pacific Institute 2006). However, in most cases, the price of bottled water, which is much higher than tap water, consists of the cost of production, packaging, transportation, retailing and advertising and marketing; it does not include the cost of water itself. Considering environmental loads of bottled water consumption, we need to re-think the use of bottled water.

3. Economic instruments as a tool to promote sustainable water consumption

Economic instruments (EI) have been used for many years as a tool to promote sustainable water demand management, as well as to attain a number of different objectives, such as a cost recovery measure for water infrastructure.

However, the actual implementation of economic instruments such as water charges is not an easy task for various reasons. Some governments hesitate to impose water charges on the agriculture and industrial sectors because they are afraid that water charges would hamper these sectors, and in turn, result in lower economic benefits throughout the country. People protest charges on water use as most consider water a free resource that should be accessible at little to no cost, since the access to water is a basic human need. In most developing countries, the lack of proper systems to impose water charges is also a major challenge in the introduction of economic instruments. Examples of implementation barriers for economic instruments include undefined rights related to water, insufficient measurement of water use and lack of reliable collection systems.

The following section will illustrate cases in which economic instruments have been applied and discuss how economic instruments can promote the sustainable consumption of water in general with the objectives of minimising water waste; maximising water use efficiency; maximising water availability by limiting the degradation of water supplies; optimising water allocation to competing users, including the environment; and limit access to sustainable levels.

3.1 Municipal water supply charges

Increase of water charges for public water supply as a tool for water demand management—Singapore

Municipal water tariffs are considered as a measure to recover maintenance and operation costs and also as an incentive to change the behaviours of consumers. In Singapore, the Public Utilities Bureau (PUB), the water authority, succeeded in reducing water consumption by implementing various measures with emphasis on water pricing. Reflecting the country's pricing policy that promotes the full cost recovery of water production and distribution and water saving to cope with water scarcity, the water tariff structure includes the following components: water tariff, water conservation tax (WCT), sanitary appliance fee and waterborne fee (WBF).⁴ From 1997 to 2000, the water tariff was revised step by step, in particular for the domestic sector (Table 7.2).

Table 7.2 Water tariff structure change in Singapore in 1997 and 2000

Tariff categories	Consumption block (m ³ /month)	Before July 1997			July 2000		
		Water tariff (S\$/m ³)	% of WCT	WBF (S\$/m ³)	Water tariff (S\$/m ³)	% of WCT	WBF (S\$/m ³)
Domestic	1-20	0.56	0	0.1	1.17	30	0.3
	20-40	0.8	15	0.1	1.17	30	0.3
	Above 40	1.17	15	0.1	1.40	45	0.3
Non-domestic	All	1.17	20	0.22	1.17	30	0.6
Shipping	All	2.07	20	--	1.92	30	--

Note 1: Water tariff and water conservation tax (WCT) are subject to governmental tax.

Note 2: 1 SGD 1 is approximately USD 0.7 (Price on 23 March 2010).

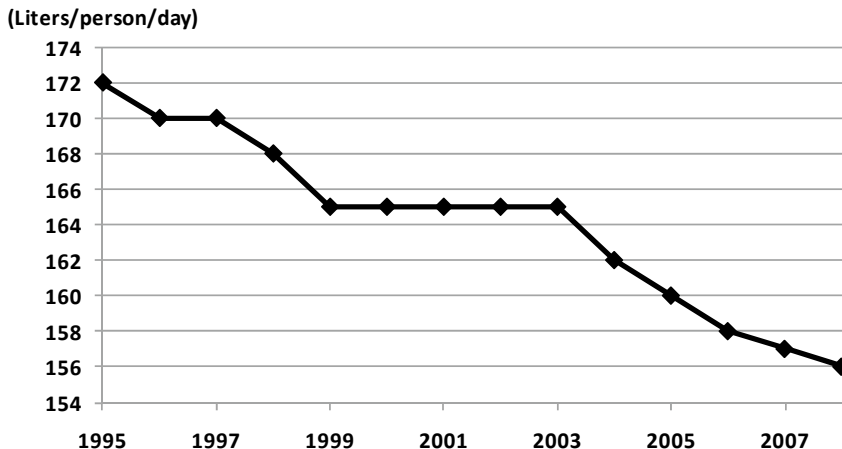
Source: Tortajada 2006

WCT was introduced to encourage water conservation efforts by users and revenue is basically used for governmental water conservation programmes, i.e., research and development to identify innovative and more efficient ways of water treatment and distribution and construction of new water supply sources to meet future water demand (Tan et al. 2009, 166). Because of the nature of the tax, WCT is channelled into the government consolidated fund managed by the Ministry of Finance, while the water tariff is allocated to PUB for operations (*ibid*).

Together with water pricing for water demand water management, the Singapore government adopted other complementary measures; for example, the instalment of water saving devices such as flow regulators became mandatory for the non-domestic sector and common areas in all private residential apartments. The maximum flow rate was designated for different water uses and penalties imposed on violators who exceed the maximum flow rate. To ensure the appropriate application of water saving devices and metering, PUB staff occasionally conduct inspections at sites where water saving devices have been installed (Kiang 2008).

As a result of these efforts, in 2008, each person in Singapore used 156 litres of water a day—16 litres (or 9%) less each day than in 1995 (Figure 7.4). Further, Singapore has targeted to reduce per capita domestic water consumption to 155 litres per day by 2012 (MEWR 2006, 9), 147 litres per day by 2020 and 140 litres per day by 2030 (IMCSD 2009).

Figure 7.4 Potable water consumption per capita/day (1995-2008) in Singapore



Note: Data from 1995 to 1998 is based on Tan et al. 2008. Data after 1999 is based on PUB Singapore 2009.

Source: Tan et al. 2008; PUB Singapore 2009

Together with increases to the water tariff and instalment of mandatory water saving devices, the Singapore government provides direct and targeted financial assistance for lower income households in the form of Utilities Save (U-Save) rebates rather than direct subsidies for water. The rebate is credited to the household's utilities account by the bill collector, Singapore Power Services, Ltd. (SP Services). The household can use the credit to pay monthly utility bills, which include electricity, gas and water. An explanation is given on the Singapore Ministry of Finance website stating that if the rebate is not used completely within one month, the household can still use it in subsequent months, giving an incentive to conserve water and energy. The amount of the rebate depends

on the type of public housing, with families living in smaller apartments receiving higher rebates. In 2009, SGD 125 million in U-Save rebates were given to households (Ministry of Finance Singapore 2009).

The above example shows that increasing water tariffs can promote less water consumption by individual water users through a combination of control measures. There are also examples in other countries where increases in water tariffs contributed to a reduction in water consumption. For example, the decline of per capita water use in the early 1970s in Finland coincided with an increase in the water tariff combined with implementing a wastewater treatment charge (Rajala and Katoko 2004). In Denmark, household water consumption decreased by 25% from 1989 to 2001, a period during which the price of water increased by 150% through a combination of taxes: water supply taxes (12%), green taxes (14%), variable taxes (9%), fixed waste water charge (2%), and the state wastewater tax (2%) (European Communities 2004, 18). In Spain, increased water tariffs in 2005 contributed to a significant reduction of water consumption in the domestic sector in 2006. In Madrid, water consumption decreased by about 7% with a 15.6% increase in water price (Global Water International 2008). Johnson et al. found that domestic consumption decreased by 30% in Bogor, Indonesia as a result of price increases (2001).

On the other hand, there are some examples that water tariff increases do not always have an impact on the water consumption behaviour of users. For example, an analysis of the correlation in decreases of water consumption observed in the 1990s in the Tokyo Metropolitan area shows that the recession of the Japanese economy seems to have had more of an impact, rather than the increase of water tariff in 1994. The analysis also shows that the increasing trend of water demand never wavered during the significant economic development period of Japan in the 1970s despite a 160% water tariff increase implemented during the same period (Takizawa et al. 2005). As this case shows, water consumption may also be affected by the social-economic background of the society, and not solely on changes in water charges.

Adequate pricing scheme introduction leads to upgraded water service—Cambodia

The water system in Phnom Penh, the capital of Cambodia, deteriorated and lost its supply capacity by the early 1990s. Most users did not have water meters, and therefore were not appropriately charged for water use. There were also a number of illegal connections, and the rate of water loss (non-revenue water) was as high as 72% (ADB 2007). This destructive situation has been improved with intensive reform of the municipal water supply scheme, including the introduction of an adequate pricing system.

The change started with government policy changes in water management. In the 1990s, the Government of Cambodia introduced the National Water Policy in which water was recognised as an economic good. The policy stated that a financially viable and socially sensitive tariff structure would be required to implement sustainable water management practices. In response to this policy, the water tariff structure was revised in 1994, 1997 and 2001. The tariff was calculated after considering the total expenses of Phnom Penh Water Supply Authority (PPWSA), including operation and maintenance costs and the depreciation cost of all its assets. The Prime Minister at that time strongly supported and publicly proclaimed in 1997 that every person and institution must pay their water bills promptly to ensure good service delivery.

Table 7.3 Water tariff structure of PPWSA in 1996 and 2002

Tariff categories	1996		2002	
	Block volume (m ³ /month)	Water tariff (Riel/m ³)	Block volume (m ³ /month)	Water tariff (Riel/m ³)
Domestic	0-15	300	<7	550
	16-30	620	8-15	770
	31-100	940	16-50	1,010
	>100	1,260	>50	1,270
Government	Flat rate	940	Flat rate	1,030
Commercial/ Industrial	<100	940	<100	950
	101-200	1,260	101-200	1,150
	201-500	1,580	201-500	1,350
	>500	1,900	>500	1,450

Note: Riel (KHR) is equivalent to USD 0.00023 (Price on 23 March 2010).

Source: Araral 2008

In the water tariff revision, the cross-subsidy rate to domestic users was lowered by reducing the difference between water tariffs for domestic and commercial/industrial sectors to increase equality among sectors (Araral 2008). As a result of the changes in the tariff structure, PPWSA could take in adequate income and become financially self-sufficient.

Reform of the institutional culture of PPWSA was also implemented to ensure disciplined and honest behaviour from the PPWSA staff. Higher salary, promotion system based on performance evaluation, and welfare system (e.g. retirement system) were introduced as the incentives for better performance (PPWSA 2008).

The reform in the pricing system and institutional culture of PPWSA was implemented in conjunction with improvements in water delivery, including the quality of water. In 1996, the PPWSA started to rehabilitate its water distribution network with support from the Asian Development Bank (ADB), World Bank and the governments of France and Japan; the rehabilitation process was completed by 2002. The public was also encouraged to report all leaks, which were promptly repaired.

To phase out illegal connections, inspection teams comprised of PPWSA staff were set up to search for, find and eliminate illegal connections. As a result, the number of illegal connections discovered in one year dropped from 300 cases in 1993 to 5 cases in 2004 (Araral 2008).

With all these measures, PPWSA was highly successful in improving their services (Table 7.4), and unaccounted water was only about 6.2% in 2008, in comparison to 1993, when it was about 72%. This is considered an exceptional case as the unaccounted water in Phnom Penh decreased by 91% in only 15 years. PPWSA accomplished a 100% supply coverage rate, which included about 120 urban poor communities. To facilitate water connection to these families, PPWSA provided subsidies for water tariffs and connection fees. After connection to PPWSA water supply, the poor could access water at lower prices than water they bought from private vendors. According to ADB, water provided by private vendors cost KHR 1,000/day, whereas PPWSA water costs were about KHR 5,000/month (2007).

Table 7.4 Performance improvement of PPWSA service

Indicator	1993	2006
Production capacity (m ³ /day)	65,000	235,000
Coverage area (%)	72	6
Supply duration (hr/day)	10	24
Number of connections	26,881	147,000
Metered coverage (%)	13	100
Collection ratio (%)	48	99.9
Non-revenue water (%)	72	6
Total income (billion riels)	0.7	34
Operating expenditure (billion riels)	1.4	9.4

Note: Operating expenditure data is from 2004 (Araral 2008).

Source: ADB 2007; Araral 2008

3.2 Water charges to water abstraction

Charge to groundwater consumption to mitigate overexploitation—Thailand

In the metropolitan region of Bangkok groundwater started to be exploited in the late 1960s, primarily to supplement surface water for municipal water supply. As economic development progressed in the region, individual use of groundwater increased, especially in the industrial sector. As a result, groundwater has been over-exploited and the region has faced considerable land subsidence problems since the late 1970s.

To cope with the overexploitation of groundwater, the Thai government introduced the Groundwater Act in 1978 and implemented several measures. The first charging scheme for groundwater abstraction was introduced in 1985 and targeted groundwater use in the Bangkok metropolitan region, except for Nakhon Pathom and a part of Samut Sakhon. There was not much effect on the reduction of groundwater abstraction in part because the rate was cheaper than other water sources, in particular water provided by municipal supply, which has surface water as its source. Insufficient water supply to meet increasing demand was also a reason behind the ineffectiveness of the groundwater charge (IGES 2007).

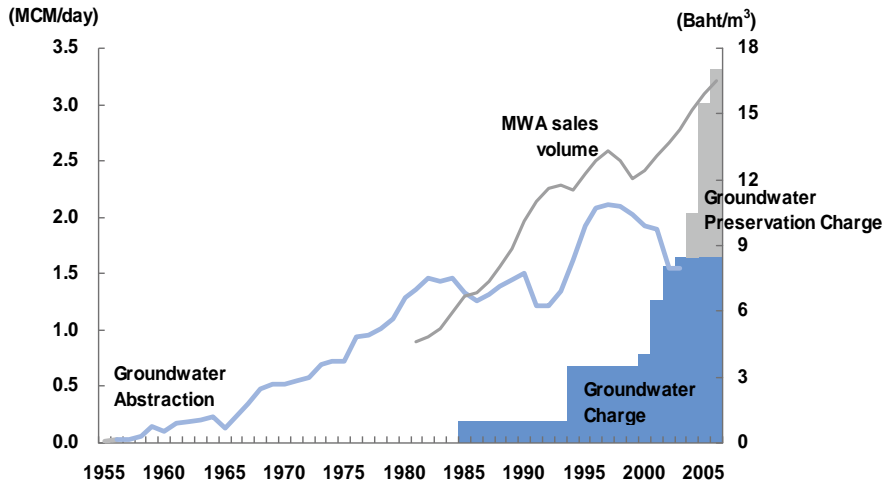
As a result of the government policy, groundwater use for municipal water supply and government offices was reduced step by step, however, groundwater continued to be abstracted, especially by the industrial sector. To further reduce groundwater demand, the groundwater charge increased gradually from THB 3.5/m³ in 2000 to THB 8.5/m³ in 2003. In addition to an abstraction charge, a groundwater preservation charge was introduced in 2004 in the areas designated as critical areas. The preservation charge started at THB 3.5/m³ and increased to THB 8.5/m³ in two years. An innovative point of the preservation charge is that it is earmarked for research and groundwater conservation activities by the Groundwater Act (IGES 2007).

Through the introduction of the groundwater preservation charge, groundwater users in critical areas had to pay more than the water supplied from the municipal water supply system. To persuade industries to reduce groundwater consumption and pay the charges, the Department of Groundwater Resources (DGR) made visits to individual industries. In areas where municipal water supply was not yet available, DGR recommended

that industries should promote conjunctive use of surface and groundwater to mitigate excessive exploitation of groundwater.

Figure 7.5 shows that abstraction of groundwater has rapidly decreased while land subsidence has been partly mitigated through a strategy of combining a strict pricing system with expansion of municipal water supply.

Figure 7.5 Groundwater abstraction and groundwater charge in Bangkok



Source: IGES 2007

3.3 Control of agricultural water consumption with economic instruments

Reduction of water consumption with removal of subsidies on shallow tube well installation associated with water price rise and cropping patterns—Nepal

In the Southern Plain region of Nepal, the Government of Nepal has implemented the long-standing, highly subsidised shallow tube well (STW) development programme. The subsidy was designed to promote and expand year-round irrigation for small farmers and also had been somewhat successful in expanding the irrigated area.

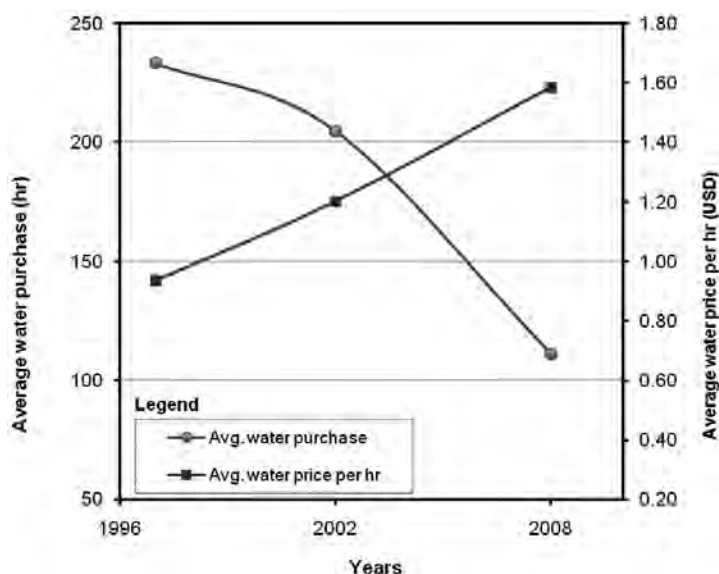
The subsidy for STWs started in fiscal year 1982-83 through a lending programme of the Agricultural Development Bank of Nepal (ADB/N). The subsidy was provided only for the installation of STWs, and separate subsidy rates were applied to group STWs and individual STWs. The highest subsidy rates for group STWs was 85% in fiscal year 1994-95 and 50% for individual STWs in fiscal year 1992-93. From 1996, the amount of the subsidy was gradually reduced and was finally phased out in fiscal 1999-2000 for individual and in fiscal year 2000-01 for group STWs. (Awasthi and Adhikary 2004). After phasing out the subsidy, groundwater use has been reduced in many districts of the Southern Plain region due to the decrease in STW installation rates and increases in the price of water. Similarly, it has also been found that many farmers had changed their cropping pattern from low value to high value crops due to the water price increases.

A case study was conducted by the Institute for Global Environmental Strategies (IGES) in September 2009 to examine the impacts of the elimination of subsidies for STW installation, including the impacts on groundwater price and cropping patterns. Three

villages in the Dhanusa district of Nepal, namely Bateswar, Bhuchkarapur and Shantipur were selected as case study areas since groundwater is the sole source of water for irrigation, and therefore it is easy to see the impacts of subsidy removal. In the case study, a total of 95 farmers who are engaged in selling and purchasing groundwater for irrigation purposes were interviewed using structured questionnaires.

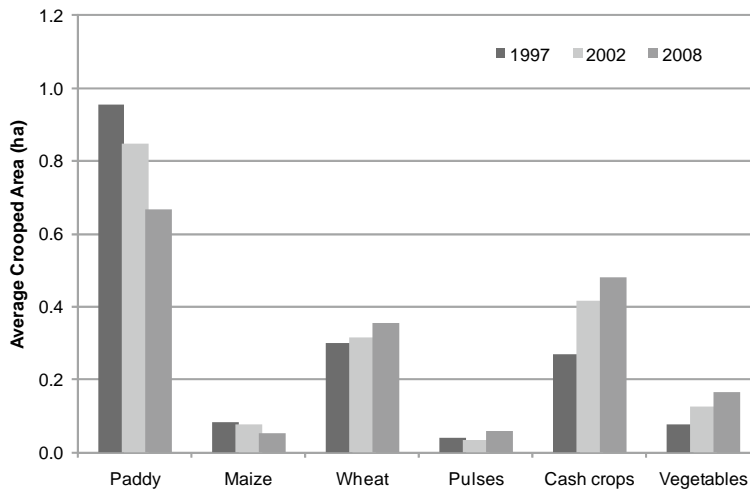
In the villages, with the phasing out of subsidies, no additional STW were installed. A number of existing STW were also out of order. A by-product of this situation is a decrease of groundwater extraction, which has resulted in a decrease of the water available for irrigation. The decrease in water available in turn resulted in an increase in the price of water in informal groundwater markets, in which farmers who have large land holdings sell groundwater extracted by using STW to farmers with small land holdings. Figure 7.6 shows changes in amount of water sold (hours) and their respective price in three different periods, i.e., during the subsidy (1997), after phasing out of the subsidy (2002) and the recent year (2008). It clearly indicates that groundwater purchase (consumption) decreased after halting STW installation associated with the increase of groundwater price.

Figure 7.6 Trends of average water purchase and average water price per hour in three different years



Source: Authors (based on the result of field survey conducted by IGES in September 2009)

Farmers had also changed their cropping patterns with the increase in the price of groundwater available for irrigation. It was observed that paddy areas generally decreased in size and the area available for cash crops (sugarcane), wheat, pulses and vegetables increased in size (Figure 7.7). The reason for this change in growing crops was mainly because many farmers could not afford to pay for higher groundwater price shifts for alternative crops, which can command higher market prices while using less water.

Figure 7.7 Changes in cropping area in three different years

Source: Authors (based on the result of field survey conducted under IGES in September 2009)

3.4 Water trading scheme to maximise beneficial use of water

Water trading is defined as “transactions between a buyer and a seller involving water access entitlements or the water allocations assigned to water access entitlements” (ABS 2006). Water trading is in practice around the world—in the western region of the U.S., in South America in Chile, in South Africa and Australia and even in Spain’s Canary Islands. In addition, informal water trading schemes exist in other countries, such as those in South Asia, for example.

The aim of water trading is essentially to maximise the benefits of water use by promoting reallocation of water access entitlements to higher-value uses (MDBC 2006). In general, water trading can be categorised into two types: permanent water trading and temporary water trading. Permanent water trading is the movement of water access entitlements from a seller to a buyer in which ownership or responsibility of the entitlements change. In temporary water trading, water access entitlements are sold and bought for a limited period agreed between a seller and a buyer.

The leading case of water trading in Australia

Australia is a country with low water availability because of its seasonal and geographical variability of the resource. Because of water shortages, water use in the agricultural sector, especially in cotton and rice irrigation, decreased, which resulted in a reduction in the total gross value of agricultural production in the country (NWC 2007). To cope with the critical water scarcity condition, the federal and state governments have been promoting water policy reform since the 1990s in which the application of economic instruments, including water trade, was identified as one of the key elements of the reform. The water trading scheme in the country is quite sophisticated, and this subsection introduces some key points in the development and implementation of the country’s water trading scheme by referring to the experiences of the development of the interstate water trading scheme in the Murray-Darling Basin (MDB), where the first interstate water trading occurred.

The separation of water access entitlements from land: Since water trading is the trade of water access entitlements, water access entitlements should be separated from land property. To facilitate water trading of water entitlements, state governments revised their own legislation on water based on the new water policy framework⁵ agreed in 1992 by Council of Australian Governments (COAG).⁶

Organisational development for interstate coordination: In principle, state governments have responsibility for water management, such as water development and allocation. Therefore, coordination among the state governments is an important element for promoting interstate water trading. In the case of MDB, the Murray-Darling Basin Agreement was concluded in 1987 among the state governments of New South Wales, Victoria, and South Australia and the Commonwealth (the federal government). In 1992, the state government of Queensland joined the renewed agreement.⁷ The objective of the agreement was “to coordinate effective planning and management of equitable, efficient and sustainable use of water, land and other environmental resources of the Murray-Darling Basin.” Under the agreement, the Murray-Darling Basin Commission (MDBC) was established as an implementation body for basin level activities. Through the Water Act of 2007, MDBC was replaced by the Murray-Darling Basin Authority (MDBA). MDBA is responsible for planning and carrying out water management at the basin level (MDBA 2009). The Basin Plan prepared by MDBA includes the development of water trading rules for further promotion of water trade in the basin (*ibid*).

Environmental concerns in water trading: Environmental concerns are reflected in the trading scheme. In MDB, total water diversion volume in the basin is capped at the levels in 1993-1994, aiming to protect the river environment and also “to achieve sustainable consumptive use to meet ecological, commercial and social needs” (Murray-Darling Basin Ministerial Council 2006). This rule, called “The Cap,” was introduced in 1995 and became permanent in 1997. The Cap became a factor in promoting water trading in the region since no additional water can be developed or diverted.

Water trading schemes are also used for environmental conservation purposes. Through the Living Murray Program which aims to restore the Murray River, MDBA offered to buy water entitlements from current water access entitlement holders in South Australia and Victoria (MDBA 2009).

Current and future issues in water trading in Australia: To further promote the water market and water trade, a National Water Commission (NWC) report on water markets indicated out several points that need further improvements to promote water trade in the country (NWC 2009). Such points include but are not limited to:

- Separation of individual water access entitlements from group or bulk entitlements (e.g., water access entitlements irrigation trust holds);
- Separation of different elements of water entitlements such as water delivery rights and water access rights, which enable water trading between different beneficial uses (e.g., irrigation users and urban users);
- Delay of water plans of state governments that resulted in delay of introduction of water trading;
- Promotion of timely processing to reduce the cost and improve effectiveness of water trade;
- Third party’s effects of water trading, such as the impacts related to water loss during transmission (e.g., evaporation) into water trading schemes to avoid third-party effects;
- Measures to cope with indirect impacts of water trade such as community decline.

Water trade in Australia has been increasing rapidly although most are temporary and at the intrastate level. However, it is expected that interstate water trade will expand by addressing the barriers identified above.

Water trade development for sustainable water management—China

Water trading between Dongyang and Yiwu, two cities located in the Jinhua River Basin in Zhejiang Province, can be looked upon as a successful case of water trading in China. Dongyang, which is located in the upstream of Yiwu in the Jinhua River Basin, has plentiful water resources—88% more per capita than in Yiwu (MWR and DEWHA 2006, 107). To cope with the critical water situation in Yiwu, the first water trading contract in the country was signed between the two cities in 2000. Yiwu bought about 50 million m³ of water per year at price of RMB 4 (\$0.57) per cubic meter from Dongyang (Liu 2008). In addition, Yiwu pays RMB 0.1 per cubic meter for the management and operational cost of the reservoir based on the actual water supply amount. Yiwu was able to cope with serious droughts even without having its own water storages, whereas Dongyang was able to utilise the funds for operation and maintenance of existing reservoirs and water infrastructure by continuing to sell water to Yiwu.

Zhangye located in the Heihe basin shows another example of water trading. In 2002, Zhangye was designated as the first pilot site for the development of a “water saving society”⁸ by the Ministry of Water Resources. Under the pilot project the local government of Zhangye allocated water resources to each irrigation unit based on the actual irrigation area of each household in 2000, issued “water right certificates,” and distributed “water tickets” based on the certificates. Water tickets are issued every year. Under the water ticket system, farmers can sell their tickets without restrictions and also request the water users association or local water administration to coordinate the buying and selling of the tickets (MWR and DEWHA 2006). Through the water ticket system, irrigation water use efficiency improved—the total water use for irrigation in 2004 declined about 10% in comparison to the figures in 2000 (Luo 2009).

Water trading is practiced in other areas of the country including the northwest, west central region, and the Beijing and Hebei watersheds. The projects are either local initiatives in response to acute water crises such as the situation between Dongyang and Yiwu, or to promote water saving by the central government, as in Zhangye (Liu 2008).

The water trading system is a promising option to promote rational use of water resources, which will help mitigate the critical water shortage problems in China. In 2008, the state government introduced the “Interim Measure for Water Quantity Allocation” with the aim to address the nationwide growing scarcity of water, water pollution and increasing water demands. This legislation provides a framework for the allocation of water use rights across the areas under the jurisdiction of the central government (Liu 2008).

In the implementation stage, however, there are various barriers. A weak definition of water user rights to be traded, lack of risk-management system where water rights are unfavourably affected, and the absence of operational rules are considered as examples of barriers to future water trading. In the case of the Dongyan-Yiwu water trade, water right systems and other settings have not been developed after the initiation of water trading. An analysis by MWR and DEWHA came to the conclusion that the case rather promoted water rights development in the area (MWR and DEWHA 2006). It also found that the success of water trading was brought about as a result of social-economic development that facilitated social acceptance of market-oriented water rights and

allocation. Considering many other areas of the country are not ready to employ market-based approaches, the approach taken by Yiwu is not always applicable to others.

The temporary transfer of water rights using the water ticketing system in Zhangye is more applicable to other areas of the country and could also promote water saving in the agricultural sector. The following points for improvement were raised to further improve the system: clarification of ownership of water abstraction permits and responsibility of the irrigation district management agency, which may play a key role in the ticketing system; flexible water supply arrangements that allow farmers to change crops; and mechanisms to reflect farmers' interests in water allocation (MWR and DEWHA 2006).

3.5 Necessity of an integrated approach of water management for pricing

Japanese case

In Japan, water demand tends to decrease due to various factors such as decline of population, increase of water recycling and reuse in industrial/commercial sectors, and less water consumption by industries due to the impact of economic recessions. Because of the decrease in water demand, revenues from municipal water supply scheme tend to decline in many cities. In addition to these factors, increases in private groundwater use have emerged as a factor that will affect the revenue of municipal water supply schemes in several years.

In principle, groundwater is considered to be a private domain in Japan and therefore, there are no specific measures to control groundwater abstraction except in areas which have experienced severe land subsidence problems caused by overexploitation of groundwater in the past, or in areas where groundwater is used as the main source of water. Registration of groundwater abstraction exceeding specific amounts is often mandated by municipal governments, but there is no strict control for groundwater abstraction.

In recent years, it has been reported that groundwater abstraction by the industrial and commercial sectors has increased and has caused a significant loss of revenue for the municipal water supply scheme in some cities. A survey of 137 municipal water supply schemes conducted in 2008 shows that 15% lost more than JPY 1,000 million/year in revenue because some industries/commercial sector are changing their main source of water to private groundwater abstraction (JWWA 2009). One of the reasons for the increase in private groundwater abstraction is that the cost of groundwater treatment has become more inexpensive due to technology advancements, and the cost of groundwater abstraction and treatment is now less expensive than municipal water. Industries and commercial sectors which have changed their main water source to groundwater are the largest consumers of water who pay higher tariffs under the increased block tariff (IBT) structure. It is a concern that municipal water supply schemes cannot sustain their services if more large water consumers change their main source of water to groundwater. To cope with this issue, there are some municipal water supply schemes which have revised their tariff structure and decreased tariffs for large users.

The implication of this case can be summarised as follows:

- In principle, direct groundwater abstraction is charged in consideration of the value of the resource. However, the current water management system in Japan leaves groundwater as a private domain of land owners, and therefore, authorities are unable to impose charges for abstraction, while surface water is designated as the

public domain under the River Law. Groundwater should be managed as part of the public domain and as an integral part of water resources.

- Revenue from municipal water supply schemes relies on large water consumers under the current IBT scheme. It is important to reconsider the current tariff scheme and minimise the risks identified in this case. Narrowing the gap of tariffs between small and large users is an option that could promote more equal burden sharing of operation and maintenance costs among users.

4. Lessons from the cases

Most cases in this chapter show that economic instruments are effective in promoting sustainable consumption of water. On the other hand, these cases also show that economic instruments cannot solely change water users' behaviour and that successes are situational.

In cases in the public water supply sector, substantial increases in water tariffs for municipal water supply affect the demand for water to some extent in both developed and developing countries. In both the successful cases in Singapore and Cambodia, the increase or introduction of water tariffs was a strong pillar used to promote changes in water consumption behaviour of consumers. In both countries, the application of economic instruments was strongly supported by the governmental policies that clearly stated the economic value of water resources and the necessity of water conservation. Proper water metering systems were also a contributing factor to the successful application of economic instruments since water meters give users of public water supply reliable information on the actual amount of water they are using.

These cases also show that increases in water price are not only the factors that contribute to the promotion of sustainable water consumption. In the case of Singapore, the mandatory installation of water saving devices was also a factor. In the case of Cambodia, the overall improvement of water supply services could facilitate adequate water supply.

The case of the Thai groundwater charges shows that the industrial sector was responsive to the increase in water charge. However, the reduction of groundwater demand in industries could not be attained without alternative water sources (municipal water supply in this case). The combination of the increase in charges related to groundwater abstraction and supply of water from other water sources led to the success of this case. In the case of Thailand, the introduction of the water preservation charge should be noted. The charge would contribute not only to a reduction in groundwater abstraction volume as an additional charge, but also to promote groundwater conservation activities by using the revenue exclusively for groundwater conservation purposes.

The direct charging of water to the agriculture sector may result in strong political backlash. In many countries, agricultural water use is not charged or is highly subsidised. To promote sustainable water consumption, the introduction of economic instruments in the agricultural sector should be considered. For example, the removal of subsidies for shallow well construction in Nepal encouraged farmers to consume less water and to consider water efficiency in production by producing higher value crops. Water trading in Australia illustrated a good example of the reallocation of water use to higher value products, although the introduction of water trading requires much effort to create an enabling environment, such as the establishment of water access entitlements, coordination of relevant governmental sectors and water users, and changes in

legislation. In the case of water trade in China, the identification of actual water uses and clarification of water rights (water access entitlements) would be major barriers to the introduction of water trading.

Finally, the Japanese case outlined the importance of integrated management of surface and groundwater. Since economic instruments are often designed for single water sources (e.g., for public water supply, surface water, and groundwater), a comprehensive picture of all water resources available in the target area is missing.

4.1 Consideration of the poor in applying economic instruments

In introducing or implementing economic instruments, consideration of the poor is one of the biggest concerns. However, as the Cambodian case shows, the introduction of water tariffs does not always prevent the poor from accessing water. Water tariffs for municipal supply are often lower than the water purchased from private vendors on which the poor without connections to public water supply depend. However, this does not mean that there is no need for financial support for these populations. Support for water connections and/or subsidies for a portion of water tariffs should be provided considering the local economic and social conditions.

In many water supply schemes in the region, the burden on low income groups was also reduced by providing quantity based cross-subsidies in the forms of IBT, which is often introduced as a target-subsidy system with governmental financial support. In the IBT structure, excess costs generated from revenues from some customers offset the cost of subsidies. For example, high-volume water consumers pay more for water and subsidise smaller water users, and higher tariffs to non-domestic users, especially industries, subsidise residential water users. For example, industrial water users pay around five times more than residential water users (Komives et al. 2005). However, in practice, water consumption is not adequately metered and therefore there are substantial non-paying or less-paying customers who are subsidised by those who pay water bills. In case of the Japanese municipal water supply charge, the water consumption patterns of large users have quickly become a concern in relation to the income generated by the municipal water supply, which shows a vulnerability of IBT from the viewpoint of cost recovery. Komives et al. pointed out that rather than subsidise water charges, it is better to subsidise water connections that the poor cannot afford (2005).

U-Save in Singapore is a direct subsidy for utility services provided by the government and clearly targets lower income families. However, the system is beneficial in motivating users to save water since they receive larger rewards by conserving resources.

5. The way forward for sustainable water consumption

Asia consumes more water resources than any other regions in the world, but per capita water use is still low in comparison to the world average. Increased water demand will continue in line with population growth and economic expansion, and water stress will intensify, especially in dry seasons. Considering the limits of water availability, the importance of demand side management (reduction of water consumption) in water management will rise even more.

Economic instruments are recognised as effective tools to motivate or encourage water users to consume water efficiently. There are some good practices in the region as shown in this chapter, but success rates are rather low. In many countries, water is still

consumed as a free good and there are few incentives for people to adopt the practice of sustainable consumption. In water supply schemes, water charges remain lower than operation and maintenance costs in many cases. The agriculture sector is often exempt from the charging scheme in most cases and pays less for water. The removal of subsidies for water development infrastructure would be an option to reduce water consumption in the sector. Water trading is also a promising option, but there are huge institutional reforms and capacity development that must be applied before a formal water trading scheme could be adopted. To promote the effective application of economic instruments for sustainable water consumption, the following points should be considered by policy makers in the region.

Economic instruments should be easily accepted if sufficient and reliable information on water use volume and usage of charges is available. For example, appropriate metering is a key factor that can be used to convince public water supply users how much they should pay in return for water actually consumed. Metering is also useful to filter out those who are along for a free ride, i.e., those who are connected but do not pay. Enough information to facilitate trust between water users and water suppliers and also amongst water users is very important.

The water tariffs of municipal water supply should look at the cost recovery of operation and maintenance costs to realise sustainable water supply. The proper tariff can be an incentive to conserve water in residential and industrial sectors.

The tax for the conservation of water resources is useful in convincing water users about the importance of water. The revenue collected from conservation tax should be used for research, financial support for water saving actions, and other necessary measures to promote conservation of water resources. Water users can easily accept such taxes/charges.

Financial support for the introduction of water saving technologies should be accompanied by water charges to accelerate the behavioural changes of water users. However, the details of such supports should be time-bound or regularly reviewed to ensure their effectiveness.

Subsidies for lower income households are necessary to ensure safe water supply for all. To provide more opportunities to access to water supply to more households, it is useful to provide subsidies for connections to municipal water supply, rather than provision of subsidies for water use volume. The installation of water meters should be also supported to ensure proper charging.

The removal of subsidies related to agricultural water is effective to motivate farmers to reduce water consumption and/or to encourage them to grow higher value crops.

Formal and informal water markets can enhance the efficient use of water such as allocating water from lower value crops to higher value crops, and from crops requiring high volumes of water to crops that do not require as much water. In order to promote water trading, water access entitlements should be separated from other related rights, especially land titles. Various and precise arrangements are necessary to introduce and practice water trading, and therefore not all countries and regions can apply the scheme immediately.

An integrated approach to water resource management is a critical element to further promote the application of economic instruments. Current economic instruments target

specific water resources and therefore are unable to reflect the total value of water in target areas.

Notes

1. Examples include large dam construction and large scale diversion of rivers.
2. Water stress can be defined in different ways. In this case, water stress is shown in the percentage of the amount of water consumed for households, industry and agricultural purposes to the total amount of renewable freshwater resources available in a country. The amount of water use does not include so-called "green water" which is "the volume of rainwater stored in the soil that evaporates from crop fields" (WWF 2008, 20).
3. BAU (business-as-usual) scenario assumes that current trends and existing plans in water and food policy, management and investment will continue. For example, management efficiency of river basins and irrigation will increase, but slowly. Public agencies manage water distribution to different sectors, although river basin organisations (RBO) would play a key role in promoting stakeholder involvement and information management. Technological innovation will take place in some water systems. For more details, to refer Rosegrant et al. 2002, 33-60).
4. Waterborne fees are charges to "offset the cost of treating used water" (Tortajada 2006, 233)
5. The water policy reform framework encouraged the State Government members of the Council to implement comprehensive systems for water allocations or entitlements backed by separation of water property rights from land title and clear specification of entitlements in terms of ownership, volume, reliability, transferability and, if appropriate, quality (COAG 1994).
6. COAG is "the peak intergovernmental forum" in Australia. Members of COAG include the Prime Minister, State Premiers, Territory Chief Minister, and the President of the Australian Local Government Association (COAG web site. <http://www.coag.gov.au/>).
7. Australia Capital Territories also joined the agreement in 1996 through a Memorandum of Understanding (MDBC website. http://www2.mdbc.gov.au/about/the_mdbc_agreement.html).
8. A water saving society is one in which people try to reduce water consumption such through the efficient use of water.

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Chapter 8

Conserving Tropical Forests: Reforming
the tropical forest products trade
towards sustainable consumption and
production

Chapter 8

Conserving Tropical Forests: Reforming the tropical forest products trade towards sustainable consumption and production

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1. Introduction

A fundamental problem of global forest management is that forests are being cleared and degraded at very high rates in many developing countries, even those where the national policy is to retain most of the forested area under forest cover. Global forest loss was estimated at an annual rate of 13 million hectares (ha) from 2000-2005 (FAO 2006) and some of the highest national rates of forest loss are found in the Asia-Pacific region. Indonesia alone lost 1.2 million ha of forest per year during this period (MoFor 2009).

Consumption decisions, sometimes made thousands of kilometres from the forests that are being destroyed, are part of the problem. Whether it is a wooden table, a house constructed with wooden framing, a ream of paper, or a bar of soap made with palm oil, remote consumer decisions send signals to forest and land managers that impact the health of forest ecosystems. When consumer choices for products containing wood materials are not informed or governed by sustainability concerns, the signal to forest managers, traders, manufacturers, house builders, retailers and others who use and handle wood materials is that they can continue with their current practices, no matter how environmentally destructive some of these might be.

Chapter Highlights

Consumption of agricultural and forest products is one of many factors driving global deforestation, one of the major environmental problems of our time. Consumption patterns are associated with the loss of natural forests in the tropics. This chapter explores the relationships between consumption and demand, production, and policy options for SCP and conserving tropic forests.

- Sustainable consumption and production is defined in the context of forest products.
- Voluntary and regulatory actions in consumer economies can support producer countries in their sustainable forest management; these include decisions by end consumers in addition to a policy mix.
- Actions by consumer economies should be coordinated with efforts to assist forest managers in the tropics to improve forest management practices and the security of supply chains to increase supplies of verified legal and certified sustainable timber.
- Unilateral action by some consumer countries to promote the consumption of sustainable wood could result in the movement of unsustainable wood supplies to countries that have not taken action. Research is now required to identify options for promoting sustainable consumption in the “new” wood consumer economies of the Asia-Pacific region.

Forest destruction is driven by many interwoven factors, of which market demand for natural forest resources, such as timber and pulp from plantations of fast growing timber species, and agricultural products, such as palm oil, soya and beef, is one.

Under such market conditions and context, greater short-term economic returns for logging companies can be achieved by harvesting beyond sustainable levels and avoiding the costs of measures to reduce logging impacts. It is also economically logical for logging operations to extract as much timber as quickly as possible in situations where there is political uncertainty or conflict over forest rights allocation, which is often the case in tropical developing countries.¹

Businesses that use wood materials and consumers benefit in the short-term through lower prices, greater volume, and greater diversity of wood species available in the market place, but globally these short-term gains have both immediate and long-term consequences.

Not only is the consumption of many wood products unsustainable, but the loss of forests that it is associated with has serious environmental and social impacts from local to global levels. Forest loss in tropical countries is of particular concern because of their rich biodiversity as well as their contribution to soil conservation and stabilisation of river morphology and hydrology, which are particularly critical ecosystem services in the tropics where rainfall intensity is high. Global forest loss also threatens the wellbeing of up to 90% of the people in developing countries who live in extreme poverty as they depend upon forests for food, medicines and construction materials, for resources that they can process and sell, and as a safety net in times of economic crisis (Scheer et al. 2003). Moreover, deforestation is now acknowledged as the second largest source of anthropogenic greenhouse gas (GHG) emissions and can no longer be ignored in the global effort to mitigate climate change.² Elimination of tropical deforestation might help to buy time for other climate change mitigation measures to take effect.

There is increasing recognition that actions in tropical developing countries to improve forest management need to be supported by actions in countries that import and consume tropical forest products. However, understanding of precisely what actions are likely to be most effective is lacking. It is tempting to draw quick conclusions about what types of policy are needed, but deeper consideration reveals that their implementation may not be so straightforward and that in some cases it could lead to perverse outcomes. For example, applying the concept of reduce, reuse and recycle (the 3Rs) to wood consumption seems to make good sense, but if done uncritically could result in increased consumption of wood substitutes that have heavier environmental footprints. Conducting campaigns to raise public awareness of forest destruction also seems a good idea, but they could be very expensive and getting through to consumers could be challenging given the myriad other messages presented to them by advertisers, campaigners and others (as discussed in chapter 1). Providing credible information on environmental performance at the point of sale would help consumers make more informed decisions, but could be difficult for wood products which sometimes contain materials from more than one forest and may be harvested, processed and sold in different countries, making it challenging to trace wood materials back to the forest from which they originated. Paying for the ecosystem services provided by forests is another option, but motivating individuals or governments to pay for services that they previously received free of charge could prove challenging. A strong policy measure would be to ban the import of wood materials from unsustainable forestry operations, but if not designed with sufficient care this could lead to trade disputes and difficulties for importers to distinguish between sustainable and unsustainable sources.

The forest products sector has been grappling with these issues for several decades. Various instruments and strategies have been devised that hold some promise for contributing to reforming the trade and consumption of tropical forest products. They mostly take as a basic assumption that their strategies need to bridge sustainable consumption and production (SCP) by combining measures in both consumer and producer countries. Merely increasing demand for sustainable forest products does not mean that suppliers can provide such products, and this is a particularly difficult problem to overcome in tropical countries where forest management practices are often well below sustainability requirements.³

This chapter focuses on consumption in developed countries (consumer countries) of forest products sourced from tropical developing countries (producer countries). The objective is to extract lessons from several instruments and initiatives that IGES is researching by assessing their designs and impacts. These are forest certification, public procurement policies, and regulations to curb the import of illegal wood. Private sector procurement policies and consumer campaigns have not been a major focus of IGES research on forest conservation, but we use Japan to illustrate some positive initiatives in these areas, and also the challenges that must be faced to achieve significant impact.

This paper begins with an attempt to conceptualise what SCP of forest products means, then reviews each policy instrument/initiative, and concludes with lessons from the review and identifies further areas for research.

2. What is sustainable consumption of forest products?

Sustainable consumption is defined in the introduction of this White Paper as “the use of services and related products which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life-cycle so as not to jeopardize the needs of future generations.” The concept of sustainable production is well advanced in the forestry sector, but the concept of sustainable consumption has received less attention. Drawing on the definition above, questions that need to be answered before we embark on a review of policy instruments and initiatives are: How do we define sustainable consumption of forest products? Who are the consumers?

2.1 Proposal for a definition of sustainable consumption of forest products

Sustainable consumption of forest products may be defined as:

Consumption of products from forestry operations that are managed according to the principles of sustainable forest management to achieve desirable environmental, social and economic outcomes; forestry operations that comply with all relevant laws; and consumption that is informed by the environmental impacts of forest products and their substitutes throughout their life-cycles, so as not to jeopardize the needs of future generations.

Criterion 1: Consumption of forest products from forests managed according to broad sustainable forest management principles to ensure desirable environmental, social and economic outcomes

Minimising the use of natural resources, as a criterion for sustainable consumption, could be interpreted as implying that the consumption of forest products should be reduced, and, indeed, some environmental non-governmental organisations (NGOs) have been

calling for such reductions. However, life-cycle analysis suggests that products from well-managed forests might have lower environmental footprints than their substitutes, such as steel and aluminium (Table 8.1), as the annual growth increment is a renewable resource, although this is an area that requires deeper research (Puettmann and Wilson 2005). Therefore, rather than viewing sustainable consumption of forest products solely in terms of minimising their use, the aim should also be to ensure that forest products are from well-managed forests. A nuanced interpretation of sustainable consumption for forest products would promote initiatives to minimise the consumption of products from poorly-managed forests and to increase their consumption from well-managed forests when they provide a more environmentally-friendly alternative to their substitutes. Reuse and recycling of wood products should also be promoted to achieve sustainable consumption, although these practices have not been studied in detail by the IGES Forest Conservation Project and are thus not covered in this chapter.

Table 8.1 Process energy requirements (PER) for some common building materials

Material	Embodied energy (MJ/kg)
Air dried sawn hardwood	0.5
Kiln dried sawn hardwood	2.0
Kiln dried sawn softwood	3.4
Particleboard	8.0
Plywood	10.4
Glue-laminated timber	11.0
Laminated veneer timber	11.0
Medium density fibreboard	11.3
Glass	12.7
Mild steel	34.0
Galvanised mild steel	38.0
Zinc	51.0
Acrylic paint	61.5
PVC	80.0
Plastics (general)	90.0
Copper	100.0
Aluminium	170.0

Source: Lawson (1996)

The introduction to this White Paper also explains that sustainable consumption, by definition, should lead to sustainable production, as someone concerned with sustainable consumption would not willingly consume an item that was produced unsustainably. What then is the sustainable production of forest products?

Forests provide both wood and non-wood products and a basic definition of sustainable production is that these should be extracted in volumes and rates that allow sufficient time for their regeneration. This notion of sustainable production is deeply imbedded in forestry theory and has its roots in the concept of sustained-yield management, which can be defined as “the scientific production of timber, based on the regulated management (including forest regeneration and the monitoring of stocks and their growth), of even-aged cohorts of trees” (Burton et al. 2003, 9) to provide a sustainable flow of fibre. The concept

was “exported” from Europe to the colonies, where it was elaborated for natural tropical forests by applying the practice of selective felling, ostensibly taking no more than the mean annual increment of tree growth. In natural production forest management the estimated maximum sustainable timber yield is often referred to as the annual allowable cut.

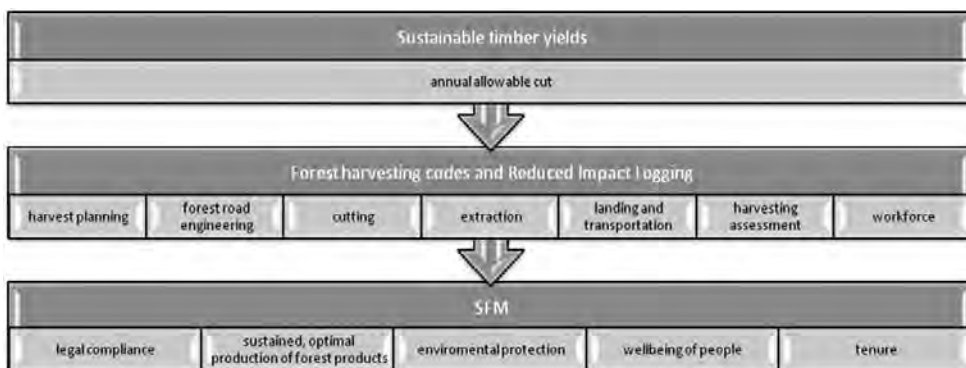
A number of studies from the 1950s onwards observed that as more powerful machinery is used in mechanised harvesting operations in tropical forests, the damage to soils and residual vegetation rises proportionally (Dykstra 2002). The understanding that minimising environmental impacts of timber harvesting is required for sustainable yields led to the publication of the *Model Code of Forest Harvesting Practice* by the Food and Agriculture Organisation of the United Nations (FAO) in 1996.⁴ Another tool, the concept of reduced impact logging (RIL) as a systematic approach to planning, implementing, monitoring and evaluating forest harvesting, evolved over several decades and is strongly promoted by the FAO, the International Tropical Timber Organisation (ITTO) and others (*ibid*).

The concept of sustainable forest management (SFM) broadened the approach to forestry beyond sustainable yields and RIL to include a wide range of social issues (Figure 8.1). In the 1970s and 1980s, activists championing the rights of forest-dependent communities pointed out that forestry operations in tropical developing countries were undermining the livelihood base of these communities as well as denying the practice of the indigenous customary institutions for forest management and use. Conflicts between logging companies and indigenous peoples drew international attention.

The United Nations Conference on Environment and Development (UNCED, also known as the “Earth Summit”) in 1992 provided further momentum for the SFM concept. While the Forest Principles it produced are non-legally binding, they position forestry within the broader objective of sustainable development by including a host of issues beyond yields and environmental impacts, such as the need for national forest policies to “recognise and duly support the identity, culture and the rights of indigenous people, their communities and other communities and forest dwellers” (UNCED 1992).⁵ There is no internationally agreed definition of SFM, but the following provides an illustration of the broad scope of the SFM concept:

[SFM is] stewardship and use of forests and forest lands in such a way, and at a rate, that maintains their productivity, regeneration capacity, vitality and their potential to fulfil now and in the future, relevant ecological, economic, and social functions, at local, national, and global levels, and that does not cause damage to other ecosystem (Ministerial Conference on the Protection of Forests in Europe 1993).

Figure 8.1 From sustainable timber yields to SFM



Source: Authors

The SFM concept builds on the experience that unless forest-dependent communities (indigenous peoples and migrants) feel that their rights and needs are reflected in formal forest tenure and management frameworks, there will be conflict between these groups, loggers, forest police and others, which makes forest management over the long term very difficult.⁶ For consumption of forest products to be considered sustainable, it is not enough that they are sourced from forests where the current rate of harvesting does not exceed the rate of regeneration. Rather, sustainable consumption occurs when forest products are sourced from forests that are managed according to broad SFM principles to ensure desirable environmental, social and economic outcomes. This perspective is in line with the broader definition of sustainable consumption used by this White Paper which requires that the use of services and products should “bring a better quality of life.” The concept of SFM requires that consumption should not only provide for a better quality of life of the consumer, but for all groups that are impacted by forestry operations, including forestry workers and forest-dependent communities.

Criterion 2: Consumption of forest products from legal forest operations

Interpreting the concept of sustainable consumption for the forest products sector requires consideration of the issue of legality. Although product legality is not mentioned in the definition of sustainable consumption used in this White Paper, it cannot be ignored in the forest products sector. Illegal forest operations, i.e., logging without a permit, are thought to be widespread in many developing countries with large forest cover, to the extent that the volumes of wood extracted illegally across some countries are believed to exceed that of their legal operations (World Bank 2006). Because illegal logging does not enter into official records, it is not possible to provide precise estimates of the volume of illegal timber that enters consumer countries. A general impression is provided by Seneca Creek Associates/Wood Resources International (2004) who suggested that as much as 23% of global plywood exports are “suspicious” and that up to 17% of roundwood on the international market could have been harvested illegally.

The concern over illegal logging is due not only to the volumes of timber involved, but also because of its wide ranging detrimental impacts. At its worst, illegal logging and the consequent trade in illegal timber may be associated with money laundering, drug trafficking, and corruption in the public sector (FAO 2006). A recent study conducted by the International Criminal Police Organisation (INTERPOL) on global illegal logging entitled “*Project Chainsaw*” concluded:

The work done to date on Project Chainsaw largely confirms the widely held belief that illegal logging and timber trafficking is, and continues to be, a significant global criminal problem, with links to other criminal problems, including use of violence, murder, corruption, money laundering and tax evasion. The project has also shown links to the financing of armed conflict (Peter Younger, Interpol).⁷

Based on these observations, consumption of forest products clearly cannot be considered sustainable if they are sourced from illegal forest operations. That a forest product is legal, however, does not guarantee that it is sustainable—forest products can be sourced legally from authorised conversion of forests to other land uses, and there may be some cases where forest laws are inadequate to ensure sustainable timber operations—although better legal compliance would likely move many forest operations in Asia-Pacific tropical countries closer towards sustainability.

Criterion 3: Consumption of forest products informed by life-cycle analysis, so as not to jeopardise the needs of future generations

The definition of sustainable consumption used in this White Paper makes an important statement about the need to consider the life-cycle of products, which has not received much attention in the global discourse on forests. This is to some degree understandable as improving forest management in tropical developing countries has proved difficult enough, without taking on the additional challenge of estimating the environmental impacts of processes associated with forest products throughout their life-cycle: harvesting, transportation, processing, use, recycling and disposal. However, the urgent need to move towards low-carbon societies now requires this analysis, which could be very instructive for identifying new and more effective policies. For example, little policy attention has been directed to the disposal of wood, perhaps because it is biodegradable, yet national volumes of waste wood can be considerable and there could be significant environmental benefits for making use of this wood. For example, it is estimated that 10 million tonnes of waste wood is produced each year in the UK, most of which is landfilled, and the Department for Environment, Food and Rural Affairs (DEFRA) (2007) suggests that 2,600 GWh of electricity could be generated from two million tonnes of this waste, saving 1.15 million tonnes of CO₂ emissions.

2.2 Who are the consumers?

Forest products take many forms and are used by a variety of groups for many purposes, requiring that policies to achieve sustainable consumption are well-targeted. That forest products are consumed as a final product in the form of furniture, paper, etc., is most obvious, but wood can also be part of a product which is viewed more as an investment than as an item of consumption, for example, housing. Wood products are also used in processes to create something else, which is then consumed or used, e.g., wood used as framing for the pouring of concrete in construction and later discarded. Consumers can be individuals as well as groups—civil society organisations, businesses, etc. There are also the “first” consumers of wood products, such as when a house is built using new wood, as well as second- and third-tier consumers that emerge when wood products are recycled or resold. Adding further complexity, the number of actors that handle wood products between the time that wood materials leave the forest and end up in the hands of consumers is considerable. Only some are consumers, yet all can be targeted by policies to promote sustainable consumption.

For the purposes of the review in this chapter, we distinguish between private individuals who consume for their own satisfaction; businesses, trade associations and other groups; public consumers (ministries, local governments, schools, etc.); and intermediaries (importers, processors, retailers, etc.).

3. Forest certification: Linking sustainable consumption with sustainable production

For the “hopeful” hypothesis that sustainable consumption will drive sustainable production to be realised, consumers must want to purchase sustainable products and be provided with information that helps them identify these products (Unless, of course, market entry for unsustainable products is stopped through regulatory measures, such as choice editing.) Eco-labelling is one of many ways of providing product information

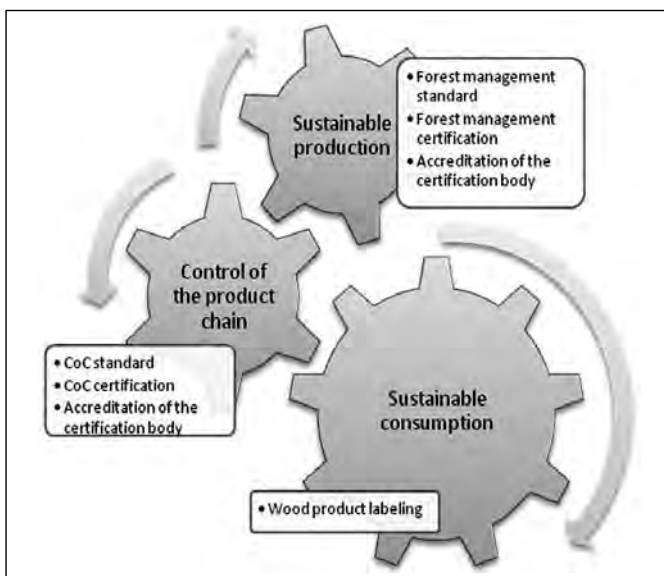
For the “hopeful” hypothesis that sustainable consumption will drive sustainable production to be realised, consumers must want to purchase sustainable products and be provided with information that helps them identify these products – unless market entry for unsustainable products is stopped through regulatory measures, such as choice editing.

on environmental performance and has the advantage of having the information affixed to the products. Eco-labelling can include first, second and third party claims of assurance that the product is sustainable, and in the forest products sector it is the latter that are considered most credible.

Third party sustainability claims for forest products are made through forest certification, which is an example of an instrument that combines measures in both producer and consumer countries to achieve sustainable consumption and production. Forest certification is a voluntary, market-based instrument to identify products with wood materials sourced from forests managed according to a set of minimum sustainability standards.

It is a complex instrument consisting of two distinct sets of certification processes, in addition to product labelling (see Figure 8.2). Both forest management and chain of custody (CoC) are certified against standards by accredited certification bodies. CoC certification is required to ensure that no uncontrolled mixing of wood materials takes place after harvesting. If the forest management or CoC audit is successful, the certification body issues a certificate that enables the holder to use the scheme's logos on its product.

Figure 8.2 Elements of forest certification



Source: Authors

Forest certification is a unique instrument with a number of strengths (see Table 8.2). Standards for sustainable forest management that include environmental, social, and economic criteria are used and accreditation ensures that the bodies responsible for the certification have the required expertise and have no vested interest in the forest or CoC they are auditing. The certification process involves not only document reviews, but also field observations of forest management and of critical control points (i.e., points where uncontrolled mixing could occur) within the product chain. Good forest certification schemes employ multi-stakeholder processes in setting standards and include processes for adequate public consultation in the certification decision.

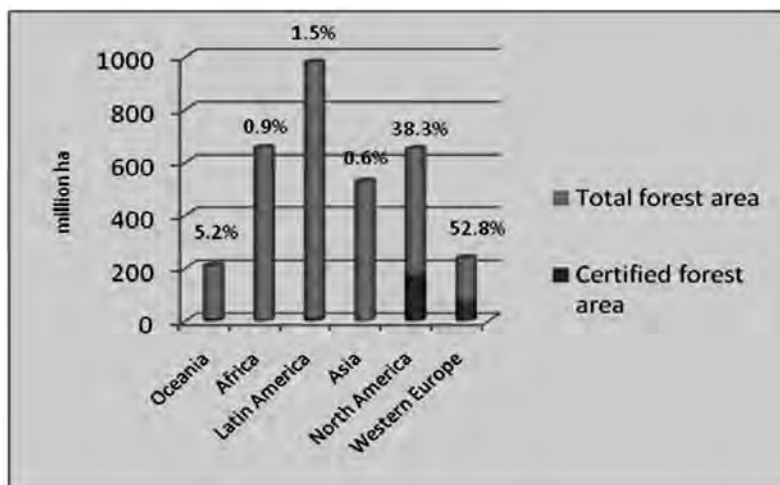
Table 8.2 Potential benefits for actors using forest certification

Actors		Benefits
Forest managers	Companies	Demonstrating expertise in forest management; market access
	Community and indigenous people's groups	Securing land tenure; local employment opportunities; forest management with reduced environmental impacts
Manufacturers and suppliers		Green credentials; product differentiation; improved product chain management
Producer country governments		Encouraging legal compliance
Consumers		Assurance that wood materials are from well-managed forests

Source: Authors

Despite these strengths, on the consumption side, forest certification has achieved limited acceptance by private and public sector consumers, and intermediaries, while on the production side, forest certification has proved difficult to implement in developing tropical countries. By May 2008, 320 million ha of forest area had been certified worldwide, accounting for 8% of total forest cover and an estimated 26.2% of global roundwood production, and in 2009, the number of CoC certifications issued worldwide leapt by 41% to reach 17,800 (UNECE/FAO 2009). However, while 53% and 38% of total forest area in Western Europe and North America, respectively, is certified, Africa, Asia and Latin America each only have about 1% of their forests certified (*ibid*, Figure 8.3). The obstacles to the certification of natural tropical forests are many and include: (i) weak forest policy formulation and forest law enforcement which means that current forestry operations are likely to be well below certification standards; (ii) inadequate treatment of customary rights in forest laws; and (iii) disputes over forest tenure.

The assumption underlying the forest certification concept that consumers would be prepared to pay price premiums for products certified as sustainable, and, in turn, that the higher market prices for certified forest products would encourage forest managers to improve their forest management and have it certified, has largely not been met. Market signals in the form of either improved access or premiums for certified products are mostly too weak. Market surveys have reported premiums in some European markets, especially for hardwoods, but there is little indication of premiums from Asian markets. A market survey on demand for independently certified and verified legal products in Belgium, Denmark, France, Germany, Italy, Netherlands, Spain and the UK found that premiums mostly only exist in parts of the hardwood sector and to some extent in the specialty softwood sector, with the highest premiums of 20% to 50% being asked for Forest Stewardship Council (FSC) certified tropical sawn hardwood from Africa and Brazil (UNECE/FAO 2009). A survey in Japan of 33 companies and three wood-related associations found little commitment to purchasing certified timber.⁹

Figure 8.3 Certified forest area in different regions

Source: UNECE/FAO 2009

While certification has not lived up to early expectations, there are some positive signals from the consumption side that new life may be injected into forest certification, including:

- Public procurement policies, discussed below, in a number of countries now use forest certification as a means of verifying the legality and sustainability of wood products.
- Increasingly, private businesses are requesting their suppliers to provide evidence of legality and sustainability (although further research is required to estimate how much of market share this accounts for on a county-by-county basis). For example, in January 2009, Bunnings, the largest “do it yourself” (DIY) chain in Australia, with over 100 outlets, and the largest timber importer, established a policy requiring verification of legal origin for decking.⁹
- Demand for certified wood products may further increase as “green building” is becoming part of corporate responsibility programmes and governments are promoting green buildings in line with their energy efficiency targets (UNECE/FAO 2009). In Japan, an initiative is underway to design “Life Cycle Carbon Minus” (LCCM) houses with units to be built and assessed for carbon reductions in 2011 (ITTO 2009a). Certified wood could be targeted as a building material.
- The growing international concern over GHG emissions from deforestation and forest degradation and the possibility of a global deal that would reward developing countries for reducing these emissions could provide further recognition of the value of forest certification as a tool to guide and to audit natural production forest management.
- The revision to the Lacey Act, discussed below, which makes it a criminal offense in the U.S. to import and handle plant materials associated with illegalities in the country of origin, could provide further impetus for the uptake of forest certification.

Some encouraging initiatives and progress can also be found on the production side:

- The number of national and international certification schemes operating in the region is growing¹⁰ and some strengthening of their standards and processes can be observed.¹¹
- New schemes to verify legality involving standards and third party audits have recently been developed or are under development. For example, *Société Générale*

de Surveillance (SGS) offers a timber legality and traceability verification service, which it recently introduced into Papua New Guinea because of requests from buyers, particularly from the Australian market.¹²

- Stepwise or phased approaches have been developed to increase the accessibility of certification to forest managers. Under these, timber producers commit to specific performance targets within set time frames and are rewarded through more secure market access.¹³
- The area of certified forests in the region is growing, albeit slowly, with a doubling of certified forest cover from 2007-2009 (UNECE/FAO 2009).

Returning to the consumption side, there are now a number of forest certification schemes, some of which are national in scope and two of which have global application, reflecting the fact that these are voluntary initiatives, rather than the results of a single intergovernmental process. Concerns have been raised that consumers may be confused by the various labels of these schemes when making product choices, yet there appears no simple solution as the schemes are effectively competing with each other in the market place. Means of harmonising certification schemes have been proposed to ensure they all meet minimum standards and some progress towards this end has been made, but not all schemes agree with this idea.¹⁴

4. Public timber procurement policies for legal and sustainable wood products

One positive measure that consumer countries can take to promote more sustainable consumption is to require the use of legal and sustainable wood products as part of their public procurement policies. Public agencies purchase a variety of wood-based products such as paper and furniture, and wood is also used in public works, such as the construction and refurbishment of buildings. Public procurement can account for a significant volume of the national consumption of wood products, though it is difficult to produce precise estimates.¹⁵

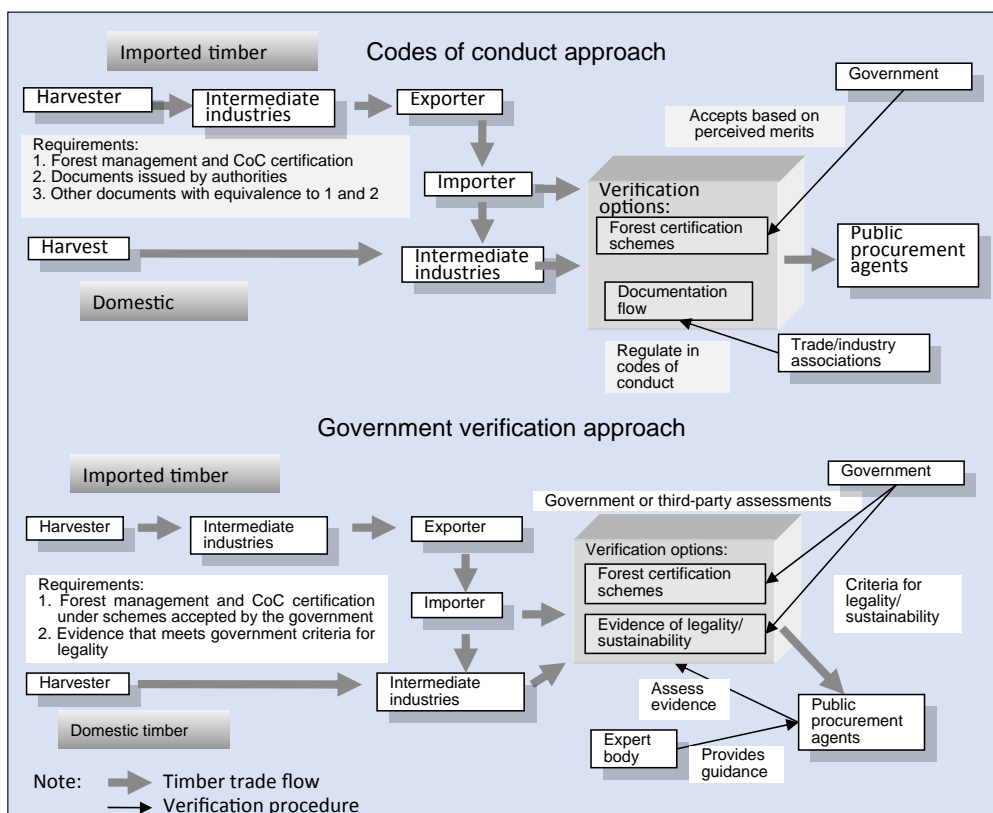
Countries that have developed public timber procurement policies include Japan, the Netherlands, Germany, Denmark, the UK, France, Spain, Belgium, Norway and New Zealand. All of these policies are crafted within broader public purchasing policies favouring environmentally preferable products and—except the first Dutch policy dating back to 1997—all have been introduced within the past 10 years.

Four policies in the Netherlands, France, UK, and Japan were assessed by IGES as part of its research on this topic (Lopez-Casero and Scheyvens 2008). A number of commonalities and differences were observed. All of the policies distinguish between verified legal and certified sustainable timber. All of the policies use forest certification for assurance of both legality and sustainability. Except for the Dutch policy, which from the onset focused on procurement of sustainable timber, the three other policies set the verification of legality as a policy requirement and view sustainability as an additional objective. In March 2007, the UK revised its procurement policy to require verified legal and sustainable timber from 2009, and from 2015, only certified sustainable wood and wood products can be procured by central government agents. Japan and France essentially accept all forest certification schemes as evidence of sustainability, whereas the Netherlands and UK require the assessment of forest certification schemes against sets of process and performance criteria before they are accepted. All policies include alternative modalities to certification schemes for verification of legality/sustainability, which in part is a reflection of the small volume of certified timber in some market sectors.

Despite the similarities of these policies, two fundamentally different approaches can be distinguished (Figure 8.4). For alternative verification modalities, Japan and France rely on measures adopted by their private industry/trade sectors (codes of conduct approach), whereas the Netherlands and the UK give the main responsibility for verification to government procurement agents (government verification approach). The former is less reliable as it depends upon all actors in the supply chain making a written declaration that they are not supplying illegal wood products or materials, and to pass documentation that attests to the product's legality on to the next actor in the chain. While self-regulation in the private sector can be more flexible and less costly than government intervention, there are clearly risks with relying on self-declarations and legal documentation such as timber removal passes, as they generally do not involve any auditing or independent verification.¹⁶

A limitation of procurement policies is that if they are only introduced by a small number of countries, illegal forest products could simply be sold elsewhere. Another risk is that if more fundamental measures are not in place to improve production forest management in developing countries, then the policies will result in a shift towards procurement of products from developed countries with a longer history of forest management and even to wood substitutes. While impacts on the industry in consumer countries and on forest certification schemes have been noted, impacts on forest management are less clear.

Figure 8.4 Two approaches to verification of legality under public procurement policies



Source: Authors

Despite their limitations, public timber procurement policies are important. They can encourage action by the private sector, promote demand for and improvement of existing legal and sustainability verification schemes,¹⁷ and, more generally, raise awareness of the illegal logging issue. For example, Fripp (2005) found that in the UK the government's timber procurement policy had encouraged some companies to create and revise their environmental codes of conduct. Moreover, the UK experience found that if certified wood is required by major customers in the public sector and enough certified raw material is available, suppliers may find it simpler to switch to 100% certified production (Brack 2008; ITTO 2009b).

5. Legality assurance through export licensing: EU Voluntary Partnership Agreements

The EU Forest Law Enforcement, Governance and Trade (FLEGT) Action Plan, adopted by the EU in October 2003, has developed an approach to combat illegal logging and the resultant trade in illegal timber that, like forest certification, bridges sustainable consumption and production.¹⁸ The FLEGT Action Plan sets out a range of measures to increase the capacity of producer countries to control illegal logging, while reducing the trade in illegal timber products between these countries and the EU. These include:

- support for improved governance and capacity building in the forest sector of producer countries;
- development of legality standards through a participatory multi-stakeholder process within individual producer countries;
- establishment of a timber legality assurance and licensing scheme;
- efforts to discourage investments by EU institutions that may encourage illegal logging; and
- support for private sector initiatives aimed at combating the trade in illegally harvested timber and timber products (European Commission 2004).

The principal instruments to implement the Action Plan are bilateral Voluntary Partnership Agreements (VPA) between EU member states and producer countries. VPAs are bilateral legal commitments to trade only in timber which is verified as being produced in compliance with a mutually recognised national standard of legality.¹⁹ The main objectives of the VPAs are to strengthen the ability of producer countries to control their forest sectors and to curb the import of illegal timber products into the EU.

Although the VPA approach focuses on legal compliance, it can be expected to contribute to sustainable consumption of forest products in the EU and sustainable production in producer countries. VPA negotiations and agreements address systemic governance issues which undermine any possibility of sustainable development in the producer country, e.g., corruption in resource allocation, lack of participation in sectoral decision making bodies or dysfunctional judicial arrangements.

Under the VPAs, each partner country implements a timber legality assurance system that contains a definition of legal timber and that guarantees that timber exports to the EU have been legally produced by means of a licensing procedure (European Commission 2005). The issuance of FLEGT licences requires credible evidence that the products in question were produced in compliance with the specified laws of the partner country. Once the timber licensing scheme is established, the EU member states' customs agencies will only allow imports of FLEGT-licensed timber products from FLEGT partner countries. The basic elements of the timber legality assurance schemes are depicted in Figure 8.5.

The intended timber legality assurance schemes have a number of strengths. The multi-stakeholder processes to decide the national legality definitions used in the schemes have potential to win broad stakeholder support for this approach, while independent monitoring, a verification system, and a CoC provide confidence in claims that wood materials are sourced from legal operations. During the process of defining legality standards, shortcomings in the existing legal framework may be identified, for example, gaps in legislation or over-complicated or unfair procedures. In such cases, VPAs could lead to law reforms in supplier countries (EFI 2009). The legality assurance systems also aim to contribute to good forest governance through increased compliance with forest laws, independent auditing, and increased transparency.²⁰

Figure 8.5 Elements of the timber legality assurance schemes under VPAs



Source: Authors

The VPA approach to allowing only licensed timber to be imported from partner countries illustrates the need to develop ways of effectively linking action in consumer countries with action in producer countries. However, as with the other policy instruments discussed in this review, the VPA approach has its limitations. One risk is “circumvention,” whereby unlicensed products originating from a producer country that has signed a VPA enters the EU through a non-signatory country. The trend towards import-process-export that can be observed in China, Viet Nam, Malaysia and elsewhere (UNECE/FAO 2009) makes this a particularly serious risk. The EU is attempting to minimise this risk by developing a regulation that will require all business that put timber from all countries on the EU market for the first time to exercise due diligence in checking the legality of their products (see following section for further explanation).²¹

6. Legislation in consumer countries to prohibit the import of illegal timber

Another regulatory demand-side measure that could make an important contribution to reforming the trade in tropical forest products, and one long called for by many NGOs, is legislation to stop the import of illegal forest products. One recent groundbreaking initiative is the decision of the U.S. to include a broader range of plant and plant materials under the Lacey Act, while the EU is also considering a legislative measure.

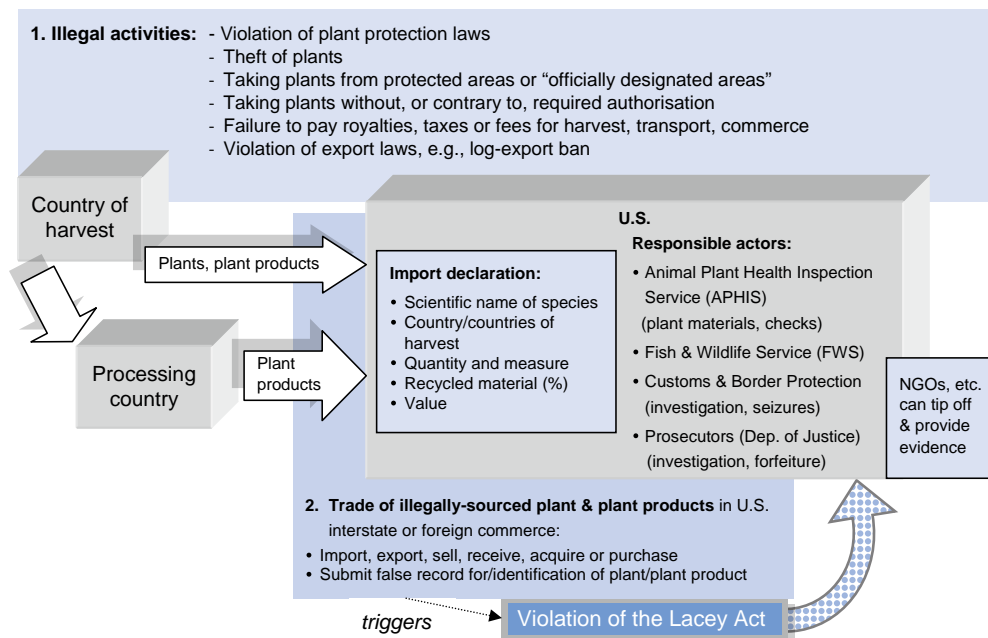
6.1 Amended Lacey Act

Through a recent revision to the Lacey Act, the U.S. has become the first country to prohibit the import, trade and sale of wood and wood products harvested in contravention of the laws of the country of origin. The Lacey Act, enacted in 1900, makes it unlawful to import, export, transport, sell, receive, acquire, or purchase in interstate or foreign commerce fish and wildlife taken in violation of U.S. laws or of any foreign laws. In May 2008, the Farm Bill (Food, Conservation, and Energy Act of 2008) extended the Act to a broader set of plants and plant products (including lumber, furniture and paper) in an effort to combat the trade in illegal timber (Figure 8.6).

The Act applies to products derived from illegal harvesting in the country of origin, including products manufactured in countries other than the country where the illegal harvesting took place. The amendments require U.S. importers to submit a “plant import declaration” with every shipment of plants or plant products. The declaration must state the country of origin/harvest and the species name of all plants contained in the goods, though no document to verify legality is required. The amendments also establish penalties for violation of the Act, including forfeiture of goods and vessels, fines and imprisonment (Gregg and Porges 2008).

A violation of the Act is triggered when a person or enterprise trades illegally sourced wood in U.S. interstate or foreign commerce. Any suspect plants or plant products may be seized and anyone who imports illegally harvested plants or products made from illegally harvested plants, or who exports, transports, sells, receives, acquires or purchases such products in the U.S., may be prosecuted. A violation of the Act can also lead to charges of smuggling or money laundering. Individuals and companies regardless of whether they are aware of illegalities in the sourcing of their wood can face prosecution, though the potential for significant penalties or imprisonment increases with the degree to which someone knows, or should have known, about the illegalities.

U.S. government officers from the Department of Homeland Security’s Customs and Border Patrol (CBP), the Fish and Wildlife Service’s Office of Law Enforcement (OLE), the Department of Justice (DOJ) and the Department of Agriculture’s Animal Plant Health Inspection Service (APHIS) are enforcing the Lacey Act provisions. Trained officers stationed in ports and warehouses regularly inspect timber shipments and prosecutors investigate cases of illegal timber trade, with support from environmental watchdog organizations, which routinely gather and make public information on cases of illegal timber trade. The first timber-related enforcement action under the revised Lacey Act occurred in November 2009 (Environmental Investigation Agency 2010). The U.S. has also signed bilateral agreements with selected consumer countries, such as Indonesia and Peru, that allow for request of information or even U.S. participation in the investigation of suspected shipments in the country of origin.

Figure 8.6 How the Lacey Act seeks to curb illegal forest product imports

Source: Authors

6.2 Proposed EU due diligence regulation

In October 2008, the European Commission proposed draft legislation that aims to put in place a new risk-based approach to tackling the trade in illegal timber by "laying down the obligations of operators who place timber and timber products on the market" (European Commission 2008). Once ratified by the European Parliament and Council of Ministers, the proposed legislation will require operators placing timber or timber products on the EU market for the first time to "exercise due diligence to ascertain to their best ability that the timber and timber products they place on the Community market were legally harvested" (European Commission 2008). The European Commission views the proposed regulation as complementary to the VPAs, as it guarantees access to wood and wood products with FLEGT licences as proof of legality from countries having concluded VPAs with the EU (European Commission 2007).²²

The due diligence system would require operators to (i) provide access to information on wood and wood products placed on the markets, (ii) develop a risk management procedure, and (iii) allow audits to ensure effective application of the due diligence system. The proposed legislation has provisions on monitoring organisations and measures, and leaves the decision on penalties for infringements up to member states. In April 2009, under the first reading of the proposed regulation, the European Parliament adopted with an overwhelming majority a legislative resolution requiring amendments to the proposal, including a prohibition of trade in illegal timber. The amendments would significantly strengthen the draft regulation, but it is uncertain whether the EU Council of Ministers will sanction them. The draft regulation provides a two-year period for implementation to commence after the regulation's passage by the EU Council of Ministers, which seeks to grant member states sufficient time to enact national executing regulations. However, the national legislative processes could be significantly shortened

if the draft EU regulation included further specification and details, which would have the additional advantage of ensuring basic standards for the due diligence systems throughout the EU.

6.3 Comparing the U.S. and EU approaches

A shortcoming of the amended Lacey Act is that the import declaration does not require evidence of legality; therefore, the only time that prosecution for materials originating outside the U.S. is likely is when evidence of illegalities comes to the attention of U.S. Customs or prosecutors. Nevertheless, NGOs are likely to seize the opportunity it offers them to be involved in bringing suspect timber to the attention of the U.S. authorities, and test cases will provide insight into how the amendments can be applied.

In contrast, the proposed EU regulation requires the establishment of due diligence systems that require evidence of legal compliance for wood and wood products brought into the EU, if they are deemed to be from “high risk” sources. In its current draft, the EU legislation is clearly weaker than the revised Lacey Act as it does not prohibit trade in illegal timber and timber products. In addition, no formal process is prescribed for NGOs and other informants to notify authorities of suspect timber shipments. Moreover, as the draft regulation depends on national implementing regulations of EU member states, there could be considerable discrepancies in the effectiveness of the draft legislation from state to state. Enforcement procedures differ between the Lacey Act, which relies on prosecution of suspect cases, and the EU, which would rely on monitoring, with the monitoring frequency determined by member state regulation. The penalties under the Lacey Act appear appropriate and severe enough to deter violations,²³ whereas the EU proposal leaves the regulation of penalties to its member states, which could again cause significant inconsistency, as timber imports could move to the states with the lowest penalties.

Both regulatory initiatives have relative strengths and weaknesses, but most importantly, they send messages from the demand side to governments, forest managers and suppliers of forest products in tropical developing countries that previously did not exist; specifically, that some of the major consumer countries are prepared to take strong action to curb illegal wood imports. Moreover, they could be instrumental in raising consumer awareness of forest management issues in the tropics and influencing consumption choices. In November 2009, Federal agents from the U.S. Fish and Wildlife Service raided the iconic Gibson Guitar factory over concerns that the company had been using illegally harvested wood from Madagascar (Lind 2009), and the impacts of such action on consumer awareness could be substantial.

6.4 Potential for adoption of legislative measures by other consumer countries

The potential for other importer countries to introduce this type of legislative instrument was not reviewed in detail, but it is clear that some countries do not favour regulation to curb illegal forest product imports. Australia seems unlikely to introduce legalisation (Centre for International Economics 2009, 73) and there appears to be no interest in Japan for a regulatory measure, which would benefit Japanese timber producers but harm importers, and does not appear suited to Japan’s non-confrontational approach to foreign policy. New Zealand has also decided against this option, with a 2006 Cabinet Paper concluding that “as New Zealand’s wood products market is very small, and relatively unaffected by the import of illegally logged products, domestic measures on the sale of such products in New Zealand will not have a significant direct effect on illegal logging practices in other countries” (New Zealand Government 2008, 6).

7. Consumer awareness campaigns and private sector procurement policies

In this section we describe actions that can be taken to raise consumer awareness of the need for sustainable consumption of forest products as well as private sector procurement policies. Examples from Japan, where IGES has been working closely with the government and NGOs on wood legality and sustainability issues, are provided. This section is primarily used for illustrative purposes as there is a lack of analysis on the impacts of the initiatives that we describe. Further research on policy options to promote sustainable consumption in Japan, where wood materials are used mostly by the pulp and paper sector and for the construction of wood-frame houses, is clearly important as Japan is the world's third largest wood importer after China and the U.S.

NGO-led initiatives: Fairwood Partners

One NGO-led initiative that is implemented by Friends of the Earth Japan and the Global Environmental Forum, and which IGES supports through analytical and other inputs, is Fairwood Partners. Fairwood Partners promotes the use of "fairwood," which it defines as wood and wood products sourced in a manner that takes into account the conditions of the forest environment and the local communities where the logging is taking place. Fairwood can include repaired and restored wood products, wood products using second-hand and waste materials, verified legal wood, wood from local forests, forests managed by local communities, and wood certified by a reliable third party (Fairwood Partners 2009).

Fairwood Partners provides consulting services to companies in both Japan and producer countries for fairwood supply and procurement. Through its services, home builders Sekisui House Ltd. and Tokyu Homes Corporation established wood procurement policies, as did furniture makers Okamura Corporation, WISE WISE, and G-Project Inc. (*Chikyū no Me* in Japanese). Sekisui House ranks second and Tokyu Homes 13th, in terms of total annual house sales in Japan, so these are significant achievements. More recently, Fairwood Partners has been working with communities in Papua New Guinea who are producing FSC certified timber, assisting their representatives to discuss supply potential with wood users in Japan.

Fairwood Partners also uses a range of media and forums to raise consumer awareness on forest issues. Along with other environmental NGOs, such as the World Wide Fund for Nature Japan, Fairwood Partners has conducted regular seminars on imported wood from high risk countries, bringing suppliers of certified wood from developing tropical countries to these events. At large public environment-related events in Japan, Fairwood Partners has operated a "Fairwood Café," providing a venue for discussion on forest issues as well as providing certified organic coffee in cups made from domestic wood materials. As a tool to assist wood users and consumers in making sustainable purchases, Fairwood Partners has created a wood selection guide that is available on its website.²⁴ The tool's search engine includes tree species and their uses, and production regions and it provides information on transport, environmental impact, and the risk of species extinction. To increase consumer awareness, Fairwood Partners also supported the production and screening of the documentary "Ways of Experiencing Wood," which describes the under-management of planted forests in Japan in the face of cheaper wood imports, and its environmental, social and economic consequences.

Government initiatives

In 2008, Japan's Ministry of Environment conducted an awareness campaign targeting the general public and end users of wood, employing a variety of media, such as posters

and pamphlets. The posters were displayed at major subway stations in the Tokyo area, and posters and pamphlets were used at show home centres. Responding to requests, the Ministry organised over 50 presentations on illegal logging and procurement to companies, consumer groups, public administrations and schools. In 2008 and 2009, the Ministry also sought to raise public awareness on the contribution of illegal logging to forest destruction through four television programmes. Environmental NGOs participated in many of these activities.

Together with the Japan Federation of Wood Industry Associations (JFWIA), the Forestry Agency is conducting a campaign to promote *goho* (legal) wood. *Goho* wood is essentially wood defined as legal using the verification processes of the public procurement policy. The concept of *goho* wood is being promoted to both domestic and international audiences through a website²⁵ and seminars/workshops, though proposals to promote the concept at show home centres was rejected by some industry representatives who felt that any product not promoted as *goho* would be viewed by end users as illegal.

Initiatives of industry and timber trade associations

In one survey of forest product trading companies in Japan, 77% of the 132 respondents stated that they had sold certified forest products in 2004, though only 10% reported a price premium for their certified products (Owari and Sawanobori 2007). Unfortunately, this survey does not indicate whether certified products were targeted by the trading companies, but there are examples of initiatives within industry to move towards the procurement, use and trading of verified sustainable products, two of which are presented in Box 8.1.

Box 8.1 Industry initiatives in Japan

Sekisui House

With support of Fairwood Partners, Sekisui House's wood procurement policy was established as a set of guidelines consisting of 10 principles covering a wide range of issues from legality to biodiversity and the well-being of local residents. Sekisui House categorises timber into four levels: S, A, B, C, with level S timber being the most sustainable, and reported that in 2007, it increased the share of S and A level timber to just under 60% of the total 374,000 m³ it procured (Fairwood Partners 2009b). Sekisui House's wood procurement policy was selected as one of eight "outstanding performance" prize winners for the first "Biodiversity Japan Award" organised by the AEON Environmental Foundation and the Ministry of Environment.

Sumitomo

Sumitomo Forestry Corporation is involved in the management of mountain forests, the trade of roundwood, processed wood products, wood chips, plywood, home equipment, construction materials, and interior products, as well as the construction of houses, apartments and buildings. It is ranked as the largest trader in Japan for wood building materials and the largest company building wooden houses to order. As part of its environmental policy, Sumitomo has established a timber procurement policy which covers procurement of legal and sustainable timber, establishment of traceability in its supply chains, reducing environmental impact throughout the product life-cycle, and stakeholder interaction (Sumitomo Forest Co., Ltd. 2009). Sumitomo has worked towards the certification of its forest holdings and supply chains in Japan and is now using certified wood material for house construction.

Source: Authors

Through their extensive membership, timber trade associations could be influential in encouraging private sector procurement policies for legal and/or sustainable wood. The membership of the Japan Federation of Wood Industry Associations (JFWIA), the umbrella organisation for wood processing and trading associations and members in Japan, for example, includes 47 prefecture-based associations and 17 national associations organised separately by the type of wood related businesses.

In Japan, actions taken by timber trade associations have mostly been a reaction to the public procurement policy and its requirement for legality verification. JFWIA, for example, established a code of conduct to meet the requirements of the public procurement policy in March 2006, and most of its member associations used this to develop their own codes. The Japan Lumber Importers Association, whose member companies represent around 40% of timber importers in Japan, was somewhat more progressive, introducing a code of conduct before Japan established its timber procurement policy.

While government, progressive companies and their associations, and environmental NGOs in Japan have promoted various measures to increase the use of verified legal and sustainable wood products, there is little research on their impacts and cost-effectiveness. Nevertheless, examples of collaboration between government and NGOs, and businesses and NGOs are encouraging, as these relationships have historically been fairly antagonistic. Seminars and workshops are somewhat more conventional approaches that are used in Japan to raise public awareness on wood consumption issues, but newer approaches using film documentaries and posters in highly visible locations are being trialled that could hold considerable promise, but will need to be well funded to be effective.²⁶

8. Discussion and conclusion

Forest destruction is a major global environmental problem in terms of scale and consequences, including irreversible loss of biodiversity and global warming, and with serious social and economic implications, such as increased poverty and vulnerability of millions of poor people. Consumption decisions by individuals, businesses and countries, even when made far from the forests, can contribute to their destruction. The documentary “Ways of Experiencing Wood,” produced with the support of Japanese environmental NGOs, provides the salient message that “we have lost our way of living with wood.”

In this chapter we have reviewed a range of innovative approaches—voluntary sustainability certification schemes, procurement policies, consumer awareness campaigns, and legislation banning the import of illegal timber or requiring checks on legality by importers—that have potential to lead towards a more sustainable tropical forest products trade (Table 8.3). Some of these initiatives are very new and their full impacts on forest management and the production of wood products are as yet unclear. Some positive impacts can be observed, nevertheless. Anecdotal evidence indicates that public procurement policies have led some suppliers in producer countries to tighten up their supply chains, while the increasing demand for wood legality verification from both the private and public sectors has prompted some forest managers to have their forests certified against legality standards.

Table 8.3 Major features of the reviewed instruments

	Type of instrument	Year	Actors responsible for development	Targeted actors	Objective
1. Forest certification	Voluntary	1st global scheme, 1993; many competing schemes thereafter	Environmental and social NGOs, forest industry	Consumers, forest owners & managers, producers and traders	SFM
2. Public procurement policies	Command and control	1st policy, 1997; others thereafter	Central and/or local governments	Directly: government suppliers Indirectly: producers and traders	Use of legal and sustainable wood
3. Export licensing (VPA)	Command and control	2008 (First VPA signed)	EU and selected producer countries; multi-stakeholder processes	Producers and traders	Consumption of legal wood in EU; forest governance
4. Legislative measures	Command and control	2008 (U.S. Lacey Act amended); EU Due Diligence Regulation still draft	U.S. and EU institutions	Directly: traders Indirectly: producers	Restricting import of illegal wood in U.S.

Source: Authors

A recurring message of this chapter is that there needs to be a well coordinated set of actions in producer and consumer countries to increase demand and supply of sustainable forest products, and to stop the supply of unsustainable products. The

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combination of a due diligence regulation for traders that place wood products on the EU market with support for the development of timber legality licensing schemes in producer countries under the EU FLEGT Action Plan, provides a strong example. Forest certification also illustrates this need, combining the auditing of forest management plans for sustainability with labelling of products from certified forests, enabling consumers to make more informed choices.

Both the EU Action Plan and forest certification illustrate a key point: that the sustainable consumption of forest products requires good forest governance to provide sustainable products, which is only achieved when all forest stakeholders have the opportunity to decide how forests should be managed and how benefits should be shared.²⁷ This explains why the EU Action Plan is not only interested in ensuring that all exported timber from partner countries is licensed as legal, but that a broad group of stakeholders in each producer country comes to an agreement on exactly how legal wood should be defined. Similarly, forest certification schemes use multi-stakeholder processes to decide how sustainable forest management will be defined and include processes for public input into the certification decision.²⁸

These observations bring us to the definition of sustainable forest product consumption presented in this chapter, which argues that sustainable consumption cannot be achieved

if production systems focus solely on the concept of sustainable timber yields. Rather, to achieve sustainable consumption, forest management plans must reflect the broader array of principles required to achieve sustainable production over the long-term, such as secure and equitable tenure arrangements, and respect for the rights and needs of forest dwelling and forest fringe communities. When these principles are not reflected in forest management, long-term investment in forestry is not attractive because of the stakeholder conflict that invariably arises.

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The instruments and initiatives reviewed in this chapter are mutually reinforcing. For example, the U.S. Lacey Act has large potential to raise public awareness of consumption as one driver of forest destruction through high profile investigations: the current investigation of Gibson Guitars is the first. Increased public awareness, in turn, could raise demand for ecolabels on wood products, for which forest certification provides the most credible option.

Nevertheless, the risk remains that action by only some countries to curb the import of illegal timber, and the inherent limitation of forest certification as a voluntary instrument, could merely lead to a shift in the consumption of unsustainable timber from one individual, company or country, to another. This issue is particularly pertinent for China, which is now the world's largest importer and exporter of forest products,²⁹ along with India, Malaysia, Indonesia and several other countries in the Asia-Pacific emerging as major wood consumers (ITTO 2008). Initiatives to reform the trade in forest products have mostly come from outside the region, but the increased consumption of wood products in Asia-Pacific countries means that attention now needs to be directed at generating sustainable consumption within the region. Thus far, most attention towards the "new" consumer countries of the Asia-Pacific region has focused on their roles as importers of raw wood materials for processing and export to final markets in the U.S., EU and Japan (UNECE/FAO 2009). There is much less study of their domestic consumption of wood products.

Another area where research is lacking is life-cycle analysis of wood products to identify effective policies for moving towards low-carbon societies. In Japan, the recycling of wood materials, the use of domestic timber, and the use of timber from the thinning of planted forests is being promoted by the government and environmental NGOs. Life-cycle analysis would contribute to a better understanding of how environmental implications of these policies match up against, for example, using imported timber from certified tropical forests, or using timber substitutes.

This review of policy instruments and initiatives shows that the concept of sustainable consumption for forest products is not well developed and there are clearly a number of issues that require deeper research to provide informed policy prescriptions. Research is needed on:

- the impacts of public procurement policies and legislation to restrict the import of illegal timber on supply chains and forest management;
- the impacts of campaigns to raise awareness on global forest destruction on consumer choices, as well as the relative effectiveness of different awareness raising strategies;
- environmental impacts throughout the life-cycle of forest products and their substitutes; and

- consumption patterns in the “new” consumer countries of the region, particularly China and India.

A further issue that requires close monitoring is the impact of Reducing Emissions from Deforestation and forest Degradation (REDD) on the production and consumption of forest products. REDD is currently being negotiated by Parties to the UNFCCC and looks likely to be part of a future global climate framework.³⁰ It is possible to foresee carbon credits from protected natural forests becoming a new type of forest product to be produced, traded and consumed, and this could lead to a large reduction in the supply of wood products as the main conventional forest yield, which would lead to a considerable increase in the price of wood products. Whether this price signal contributes to sustainable consumption by disincentivising wasteful usage or encourages production from illegal and unsustainable sources will need to be monitored closely.

Notes

1. In Papua New Guinea, for example, the average life of concessions between 1993 and 2000 was just 11 years, far below the legally required 40-year cutting cycle (Forest Trends 2006, 6).
2. CO₂ emissions from deforestation account for about 17% of total global anthropogenic emissions (IPCC 2007) and during the 1990s were equivalent to 15-35% of annual fossil fuel emissions (Houghton 2005).
3. For examples from one tropical country, see Forest Trends (2006).
4. The Code covers harvest planning, forest road engineering, cutting, extraction, landing and transport operations, harvesting assessment, and the harvesting workforce.
5. The SFM concept has evolved further through standards-based approaches to forest management, with the standards consisting of elaborate sets of principles, criteria and indicators. Intergovernmental initiatives to develop criteria and indicators for SFM include the Helsinki Process (39 European countries), the Montreal Process (12 non-European countries in the temperate and boreal zones), and the Tarapoto Process (covering the eight countries in the Amazonian Cooperation Treaty). Other initiatives include ITTO's criteria and indicators for the sustainable management of natural forests and the criteria and indicators for sustainable forest management developed by the Centre for International Forestry Research.
6. Andy White, Coordinator of the Rights and Resources Initiative, has pointed out that in the past 20 years, 30 countries in the tropical regions have been affected by serious conflict in their forested areas, finding that this is often a product of limited human, civil and property rights (presentation at Rights and Resources Initiative side event, ITTC 41st Session, 2006, Yokohama).
7. Presentation at Asia Forest Partnership Dialogue *REDD and Combating Illegal Logging*, May 2009, Bali, Indonesia.
8. The survey was conducted by Friends of the Earth Japan, Global Environmental Forum and IGES under ITTO Project PD 391/06 “Promoting and Creating Market Demand for Certified Tropical Wood and Verified Legal Tropical Wood.”
9. Interview, Bruce Telfer, Manager, Asia/Pacific, SGS Forest Monitoring Services, June 2009. In 2006, Bunnings produced a statement on timber and wood products purchasing that can be accessed at <http://www.bunnings.com.au>.
10. Papua New Guinea, Viet Nam, New Zealand, China, Australia and Japan have FSC national working groups and Papua New Guinea has an FSC endorsed national standard. Two national schemes, the Australian Forestry Standard and the Malaysian Timber Certification Scheme, have mutual recognition under the global Programme for Endorsement of Forest Certification (PEFC). Other national schemes are managed by the Sustainable Green Ecosystem Council (SGEC) in Japan and the Indonesian Ecolabeling Institute in Indonesia. The Association for Southeast Asian Nations (ASEAN) established the Pan-ASEAN Timber Certification Initiative in 2002 and is encouraging its member states to develop national forest certification schemes using the ASEAN Guideline on Phased-approaches to Forest Certification developed by the Initiative. In 2009, the State Forest Administration of China established the *Zhong Lin Tian He* (Beijing) Forest Certification Centre.
11. For example, the Indonesian Ecolabeling Institute progressed from an independent national foundation to a national constituent body, providing for wider stakeholder participation, while the Malaysian Timber Certification Council was reinvented as the Malaysian Timber Certification Scheme in 2009 to achieve PEFC endorsement.
12. Interview, Bruce Telfer, June 2009.
13. An example is the World Wide Fund for Nature's Global Forest and Trade Network which creates and brings together buyer groups and producer groups under a stepwise approach leading to FSC certification.
14. The Programme for Endorsement of Forest Certification, as its title suggests, provides a system of mutual recognition for existing forest certification schemes, but the FSC appears generally opposed to harmonisation with non-FSC schemes.
15. Marron (2003) estimated that government procurement of products and services from private sector suppliers represented 9% of GDP for OECD countries during 1990–1997. Toyne et al. (2002) estimated that in China and the G8 members, public procurement of timber, wood chips, pulp, paper and wooden furniture as a percentage of gross domestic product (GDP) averaged 17.7%, while Simula (2006) estimated that the public sector market could account for 10 to 25% of national forest product consumption. However, all these estimates are extracted from total public sector consumption, which includes substantial expenditure on compensations for employees, such as salaries and pensions.

16. For example, Japan's procurement policy recognises the Forestry Industry Revitalization Agency (BRIK) system to verify legality of forestry product exports from Indonesia. The BRIK verification system uses forest product transportation permits (SKSHH), which are known to be vulnerable to forgery and sale (Casson et al. 2006).
17. Following assessments that were conducted for the UK public procurement policy in 2004, two certification schemes, the PEFC and the Sustainable Forest Initiative, made changes to meet the requirements of the policy.
18. EU member states, some of them major global importers of timber and timber products, and the European Commission had become aware that there was no practical mechanism for identifying and excluding illegal timber from the EU market.
19. After protracted preliminary discussions, negotiations for the first VPAs started at the end of 2006. Negotiations with Ghana were concluded in early September 2008 and with Congo Brazzaville in May 2009, while negotiations with Cameroon are at an advanced stage. In the Asia-Pacific, negotiations are ongoing with Indonesia and Malaysia, while technical FLEGT talks have started with Viet Nam and China. With the Ghana and Congo Brazzaville VPAs concluded, European Commission officials expect that the FLEGT licensing scheme in those countries will require about two years to become operational.
20. Comment by Hugh Speechly, UK Department for International Development, at Asia Forest Partnership "REDD and Illegal Logging Dialogue," Bali, 28-29 May 2009.
21. The effectiveness of the VPA approach would be enhanced by intermediary countries only accepting licensed products from VPA producer countries for further processing and onward export to the EU. To this end, the EU has recently established a FLEGT Technical Working Group with Viet Nam and has also established a Bilateral Coordination Mechanism against illegal logging with China.
22. These will exempt European traders or their suppliers in FLEGT partner countries from further administrative requirements.
23. The penalties range from a civil penalty fine for "unknowingly" engaging in prohibited conduct to a criminal felony fine of up to \$500,000 and a possible prison term of up to five years in cases of having "knowingly" violated the Lacey Act.
24. <http://www.fairwood.jp/woodguide/>
25. <http://www.goho-wood.jp/>
26. Funding constraints were a factor in deciding at which subway lines the posters created by the Ministry of Environment would be displayed.
27. Governance can be defined as "the process whereby societies or organisations make important decisions, determine whom they involve and how they render account" (Institute on Governance nd).
28. Cashore et al. (2006) notes that forest certification has "encouraged and promoted multi-stakeholder participation in the development of forest policy in what had been historically closed processes between businesses and governments."
29. The State Forestry Administration of China estimated that the annual consumption of forest products will reach 210-230 million m³ roundwood equivalent (RWE) in 2010 and 400-430 million m³ RWE in 2030 (SFA 2005).
30. In the Copenhagen Accord, which the Conference of Parties took "note of" on 18 December 2009 without formally adopting it, major parties for the first time recognise "the crucial role of reducing emission from deforestation and forest degradation and the need to enhance removals of greenhouse gas emission by forests and agree on the need to provide positive incentives to such actions through the immediate establishment of a mechanism including REDD-plus, to enable the mobilization of financial resources from developed countries."

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Chapter 9

Fast-tracking Renewable Energy:
Pathways to sustainable, low-carbon
energy utilisation

Chapter 9

Fast-tracking Renewable Energy: Pathways to sustainable, low-carbon energy utilisation

Jane Romero

1. Introduction

The main challenge of sustainable consumption and production (SCP) in the energy sector is how to decouple energy use and economic development. With sustainable energy sources, it is possible to de-link energy use from environmental degradation. Energy use is not sustainable when the environmental costs threaten to grow faster than the economic benefits.

Previously, negative environmental impacts from fossil fuel use were considered as a local pollution problem that could be rectified by stricter emission standards. Recent findings state that carbon dioxide (CO₂) emissions from fossil fuels should be drastically cut at least 50 to 80% below current levels by 2050 to prevent potentially catastrophic rates of climate change (Hansen et al. 2007). The sources of energy for the future, as well as how energy should be produced and used, are critical in dictating future development paths and in stabilising the climate. Similar major changes are expected in all sectors of the economy - including water, agriculture, and forestry.

The International Energy Agency's (IEA) World Energy Outlook 2009 delivered a stark message that if the world continues on the basis of today's energy policies, the climate change impacts will be severe. Global energy demand is continuously increasing especially with the burgeoning need in large developing economies like China and India. Fossil fuels

Chapter Highlights

This chapter is based on the premise that the way energy is used today is not sustainable and the transition to harnessing low carbon energy sources should be coupled with efficient use as well as consuming less. While the focus here is mostly on top-down policies, their success lies heavily on the participation and adoption of consumers.

- Putting a price on carbon, setting coordinated renewable energy share targets, subsidy-switching from fossil fuel sources to renewable energy, and recognising the co-benefits of renewable energy could fast-track development of renewable energy.
- Complementary measures and policies on capacity building and training, technology transfer, research and development (R&D), and good governance should be put in place to sustain investments and projects.
- Bottom-up approaches empowering the choices of individuals, industries, and communities should be encouraged and supported to ensure the effectiveness of top-down government policies.
- Renewable energy technologies need consumers to use the product—sustainably produced electricity—and to drive innovation to be more efficiently produced and consumed. Consumers must choose to transcend from wasteful energy consumption to adopt lifestyle changes that support low-energy, cost-efficient and socially and environmentally friendly, cleaner options.

remain the major energy source and are projected to account for 83% of the overall increase in energy demand from 2004 to 2030 under a business as usual scenario. Correspondingly, the power sector will contribute almost half of the increase in carbon emissions from 2004 to 2030 mostly from carbon-intensive coal use (WEO 2006).

Under a business as usual scenario (BAU), 55% of power stations to be built between 2002 and 2030 in Asia-Pacific are expected to be coal fired. That would translate to an 87% share of total CO₂ emission from the power sector in the region by 2030. By 2025, 58% of global coal consumption would be burned in the region, an increase of 1.9 billion tonnes per year (WEO 2004).

The other side of the energy problem is lack of access of almost half of the global population to electricity. Asia is home to about a billion people not connected to any electricity grid. Globally, almost 1.2 billion additional people will need access to electricity and 1.9 billion people will need access to modern fuels by 2015 if we are to reach the goal of halving the proportion of people living in poverty (Millennium Development Goal [MDG]1) is to be met (UNDP-WHO 2009).

Pathways towards sustainable energy production and utilisation are of utmost importance in balancing the world's insatiable energy demand in some areas and lack thereof in other areas. It is no longer just a question of finding more fossil fuel reserves but more of harnessing the alternatives and consuming less. In China, old-fashioned coal-fired plants are being built at the rate of one per week to meet fast-growing energy demand (Feroohar 2009). As repeatedly mentioned in *The Plot to Save the Planet*, the cleanest power plant is the one that is not built (Dumanine 2008). Complementary measures such as widespread implementation and utilisation of energy efficient technologies coupled with responsible energy consumption could significantly reduce the energy demand and reduce the need to build new power sources.

Renewable energy, along with energy efficiency, has the potential to address serious concerns on energy security, energy access in rural areas and climate change. In contrast to fossil fuels, wherein most countries in Asia are dependent on imports, almost every country has potential large-scale renewable energy sources to exploit. However, the current share of renewable energy remains so low that it will not significantly reverse the environmental and security risks associated with consumption of fossil fuels. The need to increase rapidly the share of renewable energy is imperative to sustain future needs. Renewable energy development is at a nascent stage focusing on the production side since energy policy has always been public policy driven. Various policy and regulatory mechanisms are being implemented voluntarily while others are obligatory in nature.

With the enormous challenges at hand, all possible inputs from all actors and sectors are necessary. Can consumer choice boost renewable energy consumption? While the initial intention of this chapter was to delve into the role of consumers to foster sustainable energy consumption, for example, by changing lifestyles as a voluntary outcome of social change, this prospect may lack political realism. Therefore, this chapter combines a policy driven approach with consumer choice in exploring conjoint strategies that will empower consumer influence to complement the government's existing renewable energy policies.

The remaining part of the introduction discusses further the imminent need to reduce fossil fuel consumption and explore cleaner alternatives such as renewable energy. In section two, the potential of renewable energy for electricity, heating and transport uses both in rural and urban settings is discussed. While the people living in rural un-electrified areas may not have the choice to give preference to renewable energy, they simply

need electricity from whatever source is available; renewable energy is often the most pragmatic and cost effective choice that governments can provide them. Section two also explores the potential contribution of the growing niche of environmentally aware citizens who are willing to pay a premium to use “green” electricity. There are opportunities to be captured from the emerging green social conscience towards consuming sustainable alternatives. However, the transition towards sustainable, low carbon energy utilisation is not without trade-offs. The implications and possible new sources of conflicts will be discussed in section three. Possible suggestions mobilising consumers and top-down policy options will be elaborated in section four, while section five summarises the chapter.

It should be recognised that strategies should be focused not only on energy *per se* but on the sectors where energy is used, such as transportation, housing, industry, agriculture, etc. Building efficiency into the development of buildings, transportation, and industry to reduce energy consumption is far less costly than adding on technologies later. These important related issues are discussed at length in chapter 11.

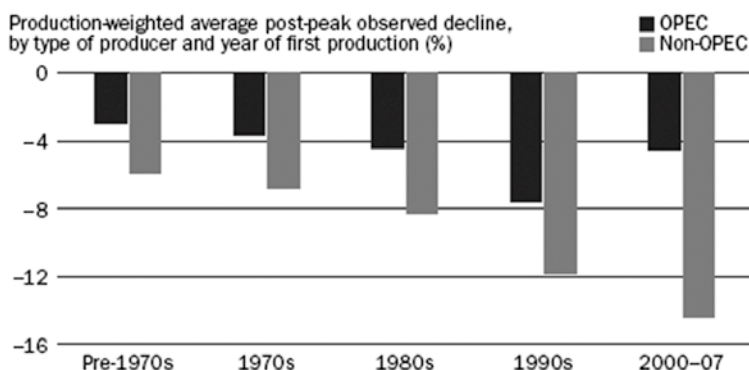
1.1 Overview of the energy sector: From dirty to clean energy trends

“The Stone Age did not end for lack of stone, and the oil age will end before the world runs out of oil.”

Sheikh Zaki Yamani, former Saudi Arabian oil minister

The global dependence on fossil fuels was again challenged when the price of oil peaked at almost \$145 per barrel in July 2008. Apocalyptic books on the impending oil crisis became mainstream reading: *The Coming Oil Crisis* by C.J. Campbell, *Resource Wars* by Michael Klare, *The Long Emergency* by James Kunstler, *Beyond Oil* by Kenneth S. Deffeyes, and *Powerdown: Options and Actions for a Post-Carbon World* by Richard Heinberg, among other notable titles. The main message of those books is that the era of cheap oil is over, the supply of oil is dwindling and there is a tremendous challenge facing the world today about how to produce clean energy to replace fossil fuels if we want to continue with our current lifestyles. The IEA 2008 data showing the rapid decline of existing oil fields substantiates the dilemma that with our business as usual approach the energy crisis will be more of a reality than fiction. The IEA projects that peak oil, where half of the available and accessible oil is already used, is very near, while others claim that we have already passed that point. Figure 9.1 shows the production declines from existing oil fields in OPEC and non-OPEC countries.

Figure 9.1 Production declines from existing oil fields



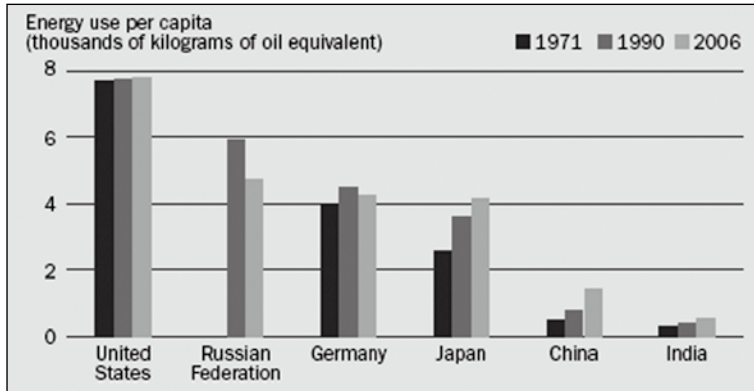
Source: World Bank 2009

In recent years, there have been frenetic plans to scout for alternatives, harnessing renewable energy from all sources—wind, sun, geothermal, waves, and biomass—and considering a bigger share for nuclear power. With oil at over \$100 per barrel, renewable energy was no longer deemed an expensive alternative. Unfortunately, the urgency fizzled out almost immediately as the impact of the global financial crisis reduced global oil demand, sinking the oil price down to about \$35 per barrel by December 2008. Investments in the renewable energy sector dropped by 23% in the second half of 2008 compared to the second half of the previous year (REN21 2009). That sudden and extreme oil price fluctuation in 2008 exposed the vulnerability of global energy security, pushing the issue up in most governments' priority policy agendas. It had the most significant impact in the transportation sector which relies on up to 70% of its fuel from oil. Most governments have responded with long-term plans to secure cleaner energy while others have topped up strategic reserves of oil.

Currently the price of oil is rising again to over \$70 per barrel, partly because the global economy is bouncing back but as most analysts say, primarily because of inelastic reserves (Lafleur 2009; Godt 2009). Old oil fields are declining and new oil ventures were cancelled when the price was low. At the earliest, it will take a year for new sources to start pumping. The need to diversify energy sources is strategic in maintaining the supply to meet current and future demand.

The recent catastrophes attributed to climate change also compounded the need for cleaner sources of energy to lessen carbon emissions. Quoting Indonesia's President Susilo Yudhoyono¹ on his recorded message at the UN Climate Change Summit on 22 September 2009, "*Remember: we can negotiate about the climate, but we cannot negotiate with the climate. We cannot ask the climate for more time.*" The impacts of climate change are no longer future problems, we are feeling it now. Scientists may not provide direct inference to climate change from the aftermath of Hurricane Katrina, the recent massive flooding in Manila, or Tropical Cyclone Tomas in Fiji, but it is likely that unpredictable catastrophes will be more frequent with global warming. Such events, however, are consistent with IPCC projections that while the frequency of tropical cyclones are not expected to change, their intensity will increase.

There is also an imbalance in energy use, which is becoming a major international concern, with the top six energy consumers using 55% of global energy (WB 2008) as shown in Figure 9.2. The World Development Indicators for 2008 further point out that high-income economies use more than 11 times the energy that low-income economies do. It is not surprising that the top six emitters of energy-related CO₂ are the same top six energy consuming countries, although China and India's per capita emissions are way below those of high-income economies, at 4.3 tonnes and 1.3 tonnes, respectively. These current trends cannot be sustained with uncertain supply. It is important to reiterate that these are energy-related emissions because emissions from Indonesia, the third biggest emitter mainly come from deforestation.

Figure 9.2 Energy use per capita of top six energy consumers

Source: World Bank 2009

Scarce fossil fuel reserves, geopolitical instability in oil-rich countries, intensifying storms, and increasing population with growing economies—these are today's inconvenient truths. However, as in any crisis, there are equal opportunities to reverse the situation. In view of dwindling fossil-fuel supply, sustainable consumption and production of energy resources has become a policy and economic imperative. Attaining sustainable energy use means paying the full cost of energy, including the cost of ensuring that future generations will have their chance to choose clean energy sources. Between the fervent enthusiasm of renewable energy venture capitalist Vinod Khosla² and the scepticism of Chevron CEO David O'Reilly,³ who thinks it is unlikely there will be significant changes in transitioning to a green economy in the next 25 years, the bottom line is that a start is urgently needed. Warren Buffet has recently been investing heavily in sustainable energy, not for climate reasons but because he believes this is the way of the future and will improve the quality of his portfolio. Adequate energy to spur development and alleviate poverty is required without depending heavily on unsustainable fossil fuels. Choosing to develop and utilise renewable energy sustainably is one of the smart options available to countries in Asia along with increasing energy efficiency and reducing energy consumption.

2. Choosing renewable energy

2.1 Overview of the renewable energy share in the energy mix in the Asian region

The Asia-Pacific region, which has many of the world's fastest growing economies, should have powerful incentives to aggressively pursue renewable energy as it is likely to become the largest energy-consuming region in the world. Renewable energy is also especially important as a way to provide electricity to people in rural areas in developing Asia who do not have access to the grid.

Promotion of renewable energy has gained support in most Asian countries with the potential of developing untapped vast renewable energy resources. Various policies and incentives are in place, or in the process of being institutionalised to facilitate investments both from domestic and foreign sources. However, despite the unilateral government initiatives and collective pronouncements of the Asian energy ministers on promoting renewable energy in the region, the current share of renewable energy in the energy mix remains low at present, although it is expected to be much more significant in the future.

The situation could change in the coming years as most governments begin to pursue bold targets as shown in Table 9.1 to utilise cleaner sources of energy. China is now the leading producer of renewable energy for heating in the world and its green stimulus package amounted to \$128 billion, the largest in the world, resulted in a dozen newly established alternative energy companies in 2008 (Foroohar 2009).

Table 9.1 Renewable energy targets of selected Asian countries

Country	Target
Bangladesh	10% electricity share by 2020
China	15% primary energy by 2020 (already exceeded existing target of 10GW of wind capacity, plans new large scale "wind power bases" in six provinces that can generate 100GW new wind capacity by 2020)
Chinese Taipei (Taiwan)	10% of electricity by 2010
India	Increased target to 14GW of new renewable capacity by 2012
Indonesia	9.5GW of geo-thermal by 2025
Japan	New targets for 14GW of solar PV by 2020 and 53GW by 2030
Philippines	4.7GW total capacity by 2013, a 100% increase in current RE capacity
Singapore	50,000 square meters (~35MWth) solar hot water by 2012
South Korea	New primary-energy share 6.1% by 2020 and 11% by 2030
Thailand	8% by 2011

Source: REN21, 2009 Renewables Global Status Report; REN21, 2007 Renewables Status Report

2.2 Potential for future large-scale renewable electricity

Most Asian countries have renewable energy policy targets and abundant resources which could potentially be used on a large scale. Currently, renewable energy provides nearly one-fifth of the global electricity demand, mostly from large hydropower, while other sources grow steadily. Notwithstanding the often cited barriers—higher costs relative to conventional fossil fuels, intermittent and variable output, location mismatch between source and demand, among others—numerous studies show that renewable energy could be mainstreamed to supply significant amounts of electricity. Numerous global scenarios by different organisations and experts (WBCSD 2005; EREC 2004; Greenpeace and EREC 2007; Johansson et al. 1993; EC 2006; IEA 2006) modelled the potential world electricity share from renewable energy sources in 2050. The scenarios considered the inter-play between many conditions and interrelationships among many variables such as current and future technology options, economic and population growth, environmental emissions, energy demand, resource availability, constraints and barriers of many forms as well as integration strategies and policy recommendations for the future (Martinot et al. 2007). The simulated results are very promising with the global share of renewable energy in 2050 ranging from the modest International Energy Agency's Energy Technology Perspective's (IEA-ETP) estimate of about 7,000 TWh to the World Business Council for Sustainable Development's (WBCSD) more than fivefold increase at about 37,000 TWh. However the results of those scenario models should be interpreted with a caveat—they are not predictions. As experienced with the recent global financial crisis, so-called "black swan events" are rare but have the potential to overturn fundamental assumptions.⁴ It is important to put in context that "if-then-else" scenarios and results could provide insights towards better understanding of the range of possibilities available in drafting long-term renewable energy policies. Even if only modest estimates would materialise, renewable energy would still be significant in the future energy mix.

2.3 Beyond electricity in rural areas, the off-grid approach

Provision of reliable and affordable energy access is one of the key MDG targets. It is ironic that in our present times of modern technology breakthroughs, still more than half of the population in developing countries do not have access to electricity as shown in Figure 9.3. Energy deficiency correlates closely to many poverty indicators. The amount and quality of energy consumption has a co-relation with poverty, deprivation, social seclusion, access to knowledge and achievements, health, livelihood and security (ESCAP 2005).

Figure 9.3 Share of people without electricity access for developing countries, 2008



Source: UNDP 2009

In most rural areas relying on biomass for basic cooking, lighting and heating needs, women and children are tasked to gather fuel wood, agricultural residues or dried cow dung. As resources are decreasing, the activity takes more time, leaving less time for other productive work and in some cases making it difficult for children to attend school so that they can help with household chores (Mencher 1989). In addition, about 40% of the global infant mortality rates caused by pneumonia occur in Bangladesh, India, Indonesia and Nepal; many of these deaths are caused by pollutants from indoor burning of traditional fuels (ADB 2002). Energy access in rural areas transcends beyond having electricity; it saves lives, empowers women to engage in more productive income generating work and keeps children in school.

Modern energy supply must not only be made available to the poor, but should also be made affordable for them before any substantial benefits of human growth or poverty reduction can be realised (ADB 2006). Owing to low financial resources in energy deficient areas, it is largely up to national governments or NGOs to initiate off-grid electrification projects.

2.4 How to scale up off-grid projects?

It is important to recognise, at the outset, that rural electrification is not an end in itself. Provision of electricity must be integrated with community development to ensure optimum benefits. It is the means to improving the people's livelihood, education, and health towards leading a better quality of life.

In implementing decentralised grids, the needs and natural endowments of different rural communities vary, and thus, so do the corresponding appropriate renewable energy source or technology and implementation schemes. Often the challenge is not on how to bring in the technology or harness their natural resources but how it can be sustained. Most projects are focused on starting a project without the complementary capacity building necessary for the community to adapt and sustain the project, perpetuating the boom-bust cycles of isolated pilot projects. Support should focus on institutions rather than individual projects, as project-specific funding tends to create these boom-bust cycles and does not generally build institutional capacity (Kammen 1999). China implemented an ambitious rural electrification programme in 1,000 townships within 20 months through the creation of mini-grids. Institutional development and training were built into the programme and 30% of the total project funds were allocated to trainer's training on a local basis (Ku et al. 2003).

Generally, the most successful rural electrification projects are those that involve the community. The Grameen Bank of Bangladesh administers loans for photovoltaic solar home systems to serve those without access to electricity. The Philippines and Bangladesh have networks of consumer-owned and managed cooperatives that receive financial incentives in exchange for meeting annual performance targets and providing electricity to members and the local community (Osafu and Martinot 2003). In contrast, the top-down approach in implementing the Energy Self-Sufficient Village (ESSV) biofuels project in Indonesia has not been successful in utilising the equipment provided by the government to harness renewable energy in recipient villages (See Box 9.1). Engaging the community and investing in human development through capacity building and training, with a fraction of the start-up renewable energy equipment cost, can increase the long-term sustainability of decentralised energy projects.

Box 9.1 Indonesia's Energy Self-Sufficient Villages (ESSV) biofuels project

One-third of Indonesia's population have no access to electricity in spite of the fact that the country used to be an active OPEC member and has abundant untapped renewable energy sources. About 37 million people or 17% of the total population live below the national poverty line earning less than \$14 a month. As part of the main strategies to address rural development, the government launched the Energy Self-Sufficient Village (ESSV) project targeting 1,000 villages in remote areas to be self-sufficient in their energy needs by utilising their own local renewable energy resources. Of the 1,000 villages, 500 will produce their own supply of biofuels from *jatropha*, cassava or sweet sorghum to run basic equipment for lighting and farm activities, and to replace the use of kerosene for cooking purposes. The other 500 villages will harness their water resources to develop mini-hydro or pico hydro power and install solar photovoltaics (PV). The biofuel-based project is now implemented in almost 150 villages. Unfortunately, the success rate is lower than expected despite the government's assistance providing the necessary processing equipment. The feedstock supply is too unstable to operate continuously. What the farmers in the villages primarily need is the know-how to improve production output for them to be encouraged to plant the required biofuel feedstocks for energy purposes. However, government funding is mostly allocated for the procurement of equipment and building of mini-processing facilities. To ensure a stable supply of feedstocks, farmers should be trained to improve productivity and be made aware of their role in expanding agriculture benefits to also address their energy needs.

Source: Chew 2009; Author unpublished survey notes 2009

2.5 Renewable electricity in the cities

Achieving the intended shift from fossil fuels dependence to renewable energy use is a socio-political problem. However, this is driven by growing individual energy needs. Most of the discussions and solutions are addressed on a national scale forgetting that it is not the country itself but the citizens of that country who need the energy. The collective demand for more energy, either directly or indirectly, is the problem. Therefore despite differentiated capacities, everyone could be part of the solution by consuming less and giving preference to green sources.

Changing consumer demand will be an essential element to achieving major changes in energy consumption and carbon emissions, in addition to changing production processes (UN-DESA 2007). Environmental awareness in Asia is fast catching up with the West. Recent natural disasters are unfortunate reminders of what could happen with greater intensity if the impacts of climate change become widespread. Empathy could be a driver for change. Greater awareness of the factors affecting our energy supply and demand is necessary to support bottom-up actions to complement and support government renewable energy and energy conservation policies.

2.6 Private installations

The prohibitive costs of renewable energy technologies slow down its promotion. The consensus is that its mainstream use will only happen when it can already compete in the market without government subsidy. However, it should be noted that if the same level of subsidy was given to renewable energy, it would already out-compete fossil-fuel based electricity. In the U.S., wind power now costs just six cents per kilowatt-hour on average—less than natural gas and roughly even with coal. Similarly, PV module prices have fallen drastically: the nominal price of module has declined from over \$5.00 per watt in 1993 to below \$2.50 per watt in 2009 (Sawin and Moomaw 2009).

The price decline on renewable equipment and technology has not yet had much of an effect in most countries in Asia dependent on imports, but there is growing interest. Social norms marketing can be employed in initially tapping the rich to install solar power or solar heaters in their houses to reduce the price of solar PVs so that in the long run, it is affordable enough for mass consumption (Box 9.2). It may not make economic sense even for the rich, but their environmental motivation could help in addressing the adverse effects of climate change. Recognising our inter-dependence can spur the momentum of undertaking individual actions with global benefits.

Box 9.2 Roof-top solar PVs in Japan

More than 80% of Japan's share of solar PVs is installed on roof-tops of private households. The Institute for Sustainable Energy Policies (ISEP) conducted a survey in 2004 to assess the response of households, their motivation and expectations in joining the government's Sunshine Program. Interestingly, most households saved energy not only from the installation of roof-top PVs but also from improved energy-saving practices that they became more aware of when they joined the programme. Notable co-benefits upon installation of roof-top PVs, such as positive changes in environmental behaviour (e.g., switching off lights and appliances when not in use, family members staying in one room to maximise use of heaters or air-conditioners, etc.), and fostering communication within the family and other PV home-owners were cited by the respondents.

Source: Iida, T. et al. 2006. Renewable energy and social innovation in Japan.

2.7 Green power

Another way of promoting renewable energy is by requiring conventional power producers to offer green power either generated by them or sourced from other producers. It is important to align the objectives of conventional power producers. They should be given incentives to meet the demand without building new fossil fuel based plants. The conventional way of encouraging alternative energy into the main grid is by feed-in tariffs or renewable portfolio standards (RPS). With feed-in tariffs, electricity utilities are obligated to buy renewable electricity at above-market rates set by the government while the RPS mechanism generally places an obligation on electricity supply companies to produce a specified fraction of their electricity from renewable energy sources. These government incentives are usually phased out after a certain target of renewable market penetration is achieved. As renewable energy is generally more expensive than subsidised fossil fuels, government targets are also often low to avoid passing on to consumers the burden of purchasing green power.

In hindsight, is it really a “burden” on the consumers? If properly explained and reflected in electricity bills, it is worth exploring the feasibility of paying a slightly higher fee for greener power now than paying the true cost of using fossil fuels in the future with a damaged environment, health problems and possible oil-driven conflicts (Box 9.3)?

While there is a growing consensus on the co-benefits of harnessing renewable energy, it is not yet strongly translated into consumer preferences. A green pricing policy was introduced in the U.S. in the early 1990’s and has slowly carved its share of eco-patrons who consider green pricing an exercise of personal choice, economic efficiency, and the capacity of consumption to cure society’s ills (Miller and Serchuk 1996).

Box 9.3 Green power 101

Green power is a subset of renewable energy and represents those renewable energy resources and technologies that provide the highest environmental benefit. The Environment Protection Agency of the U.S. (EPA) defines green power as electricity produced from solar, wind, geothermal, biogas, biomass, and low-impact small hydroelectric sources. Customers often buy green power for avoided environmental impacts and its GHG reduction benefits.

Green power market sellers are divided into three categories:

- Electric utilities that offer their franchise customers a green power option, by green pricing
- Energy marketing companies that offer green power competitively in restructured markets, usually distinguished as green power marketing
- Marketing companies that sell the attributes of renewable energy (such as cleaner electricity production, support for renewable energy generators, fuel price stability and emission reductions) as tradable renewable energy certificates, renewable energy credits or green tags

Source: US EPA Green Power Partnership (<http://www.epa.gov/grnpower/gpmarket/index.htm>); American Wind Energy Association 2004, *Green Pricing Resource Guide*

Eco-patrons, who ideally could be everyone, can support the power utility’s renewable power infrastructure by paying a premium included in their electric bill, or can buy renewable energy certificates—also known as green tags—if the power utility does not

offer green power. The bottom line is not only about greening the power sector, it is also about people taking positive action to prevent further unsustainable and destructive use of natural resources.

2.8 Smart grids and smart meters

Transformation of the entire energy system to address the challenge of climate change not only requires low-carbon energy sources but efficient grid systems as well. The IEA has projected that more than \$16 trillion will be needed to build smart grids worldwide between 2003 and 2030.

Smart grids optimise the role of communication from suppliers to consumers in power distribution (Box 9.4). Using two-way digital technology, smart grids provide real time information to manage supply and demand and smooth out demand peaks by making consumers active participants in the production as well as consumption of electricity. Smart grids complement the variable nature of renewable energy as it can better handle fluctuations in power and can reduce line losses through the use of more local, distributed generation. Smart meters may be part of a smart grid and provide a communication path extending from generation plants to electrical outlets which, by consumer option, can manage selected devices during peak or off-peak demand periods. When power is least expensive, a smart grid could turn on selected home appliances such as washing machines or industrial processes that can run at arbitrary hours and electric vehicles to store power for transport use. At peak times, it could turn off low priority appliances like water heaters or entire building heating and cooling systems to reduce demand. Eventually as more homes and businesses begin generating their own renewable energy either from wind or solar PVs, a smart grid can coordinate production of power from large number of small producers and enable them to sell surplus energy back to the grid.

Box 9.4 Smart grids and smart consumers

Capitalising on the potential of smart grids to motivate consumers to actively participate in the operations of the grid, smart grids can induce further lifestyle changes as consumers may change their behaviour on how they consume energy relative to variable electric rates during peak or off-peak periods. A survey was conducted that links marketing evidence of consumer demand for greater choice (IBM 2007). Almost 100 utility executives were interviewed as well as 1,900 households and small business from the U.S., Germany, Netherlands, England, Japan, and Australia. Some of the findings are below:

- 83% of those who cannot yet choose their utility provider would welcome that option.
- Roughly two-thirds of the customers that do not yet have renewable power options would like the choice.
- Almost two-thirds are interested in operating their own generation, provided they can sell power back to the utility.

Source: IBM. 2007. IBM Energy and Utilities Global Residential/Small Business Consumer Survey. http://www-03.ibm.com/industries/utilities/doc/content/landingdtw/3165578119.html?g_type=pspot

Full development of smart grids is a few more decades in the future but there are some existing examples. The Telegestore project completed in 2005 in Italy is one of the earliest and operational examples of a smart grid system. The company took charge of its full operations; designed and manufactured their own meters, acted as system integrator,

and developed their own system software. It is the first commercial scale smart grid technology and the project cost amounted to EUR 2.1 billion and delivers annual savings of EUR 500 million (NETL 2008).

3. Implications of low-carbon strategies

Adopting renewable energy on a large scale is not without problems. In most countries in Asia, smart grids are still a ways in the future. In the short-run, concerns on possible loss in economic competitiveness and lack of funding and technology are crucial issues of developing countries. These factors were lengthily discussed in the IGES RISPO II (IGES 2008) study on the environmental impacts of trade liberalisation in Asia. Some of the salient points are as follows.

Short-term implications

Prisoner's dilemma inhibiting renewable energy promotion

The inherent high initial cost of renewable energy leads to a prisoner's dilemma, in which incentives are created for countries to under-invest in renewable energy. Countries which increase renewable energy utilisation essentially pay a price premium to obtain its environmental benefits. Countries perceive that increasing renewable energy use will mean a loss of economic competitiveness in high energy-using industries. Unfortunately, in most developing countries, economic development gains are prioritised over environmental benefits.

An international or regional approach in which countries jointly agreed to increase their renewable energy targets would help to avoid these effects on relative economic competitiveness. The targets could be differentiated as for the Kyoto Protocol so relative changes in economic competitiveness can be minimised.

Globalisation increases the importance of cost, which favours fossil fuels over renewable energy

Renewable energy policies must take into account the current and future trade liberalisation initiatives which make the cost of production increasingly important for trade and business. Under these circumstances, renewable energy, which is often costlier than (subsidised) conventional power, is less attractive. Thus, trade liberalisation will increase the importance of cost in the process of choosing fuel types for electricity generation, making it more difficult to promote higher cost renewable energy, unless supported by additional policy measures.

This trend is magnified by governments' priority focus on immediate and short-term energy security, which is usually a higher priority than environmental problems. Therefore, in part because of this enhanced emphasis on cost, the majority of government efforts are focused on fossil fuel supply security, storage and indigenous exploration, while efforts to promote use of renewable energy are limited.

Intermittent nature of renewable energy

Problems caused by the intermittent nature of renewable energy, at least for solar and wind technologies, could be greatly reduced by increasing the scale of the grid through expanded international grid interconnection and increased electricity trade. A stable back-

up is necessary to pursue increased renewable energy utilisation as shown from the EU experience of building an interconnected and efficient energy system to obtain its 2020 target to seek 20% of its total energy consumption requirements from renewable energy (EP 2007). There has been limited scope for trading electricity in physical terms in Asia, mainly because of geographical constraints on grid interconnection. In contrast, in many other parts of the world, electricity has become a tradable commodity by using cross country grid interconnection.

Technology transfer or renewable energy development capacity

It is not easy to develop capacity to implement renewable energy policy, which requires significant financial and technical resources, and most developing countries need assistance. Therefore, some kind of mechanism for transferring financial and technical resources for renewable energy promotion to developing countries is desirable. However, it is important to recognise that each country has a unique set of renewable energy resources, so assistance needs to be tailored to each specific case and context.

Long-term implications

A grid upgrade is an essential precondition in large scale renewable energy integration. It is necessary to integrate large scale off-shore as well as small scale localised and decentralised renewable energy sources. Recognising the location mismatch of renewable energy sources and where it is mostly needed, strategic interconnections will be required to transport renewable electricity from remote locations to consumption centres.

In East Asia, four power grid interconnections already exist while another 11 to 14 new projects are under consideration. These interconnections have improved political relations between economies and provided opportunities to develop closer regional energy cooperation (APEREC 2007). However, this grid interconnection covers only a limited part of the Asian region, so there is considerable scope for expansion, and in the meantime, the current potential for electricity trading is limited. Grid interconnection should be advanced in the region not just to promote electricity trading but also to promote renewable energy since it will also enhance overall energy efficiency. Therefore, there is a clear need for regional cooperation to coordinate policies to promote the electricity trading and grid interconnection and expansion to promote renewable energy and enhance overall energy efficiency. This could be facilitated by trends towards increased regional economic integration.

3.1 On greater nuclear energy use

Nuclear energy is undergoing a renaissance after slowing down in the 1970s. Given that the whole renewable energy portfolio cannot fully supply the total energy demand there is a growing consensus on the necessity of getting additional energy supply to meet demand from nuclear energy. On the one hand, nuclear energy is deemed cleaner than fossil fuels as it is emissions-free, scalable, comparatively energy efficient and already using proven technology. On the other hand, the real and perceived risks are high. The disposal of spent fuel is an ongoing dilemma with no agreed options yet other than safely keeping it until appropriate technology will be available in the future. The security risks are also evolving from perception, as the images of Hiroshima and Nagasaki are still vivid when nuclear energy is mentioned, to becoming real with the persisting unrest in some countries with nuclear ambitions.

It is very critical, and at the same time, fragile, to rationalise greater nuclear power use because of climate change. Ironically, NATO-member countries are spending more in restoring order in war-torn countries with huge fossil fuel reserves than investing in climate change mitigation and adaptation measures. New renewable energy sources, including solar, wind, geothermal, and biomass, represent less than 4% of the total energy supply, and in FY 2008, total U.S. government support for Department of Energy's Energy Efficiency and Renewable Energy programmes was \$1.98 billion (EESI 2007)—roughly 15% of a month's operating costs in 2008 for the Iraq war as estimated by noted Nobel Laureate Joseph Stiglitz (Stiglitz and Bilmes 2008). Furthermore, to some extent, the impacts of climate change are perceived as slow suffering while the risk of nuclear armament is instant annihilation.

Setting aside the perceived security threats assumed with the growth of nuclear energy, economics and long construction periods are the major constraints in building more nuclear plants. Planning, licensing, and constructing a single nuclear plant typically takes 10-15 years, and completion deadlines are frequently missed, often due to community resistance. And because of the large capital requirements and long lead times, nuclear plants face a risk premium that other generators do not—a risk that will be exacerbated by tight financial conditions in the years ahead. In the United States, it is now estimated that nuclear plants cost twice as much as a coal plant to build and five times what a natural gas plant costs. Nuclear power also does not come cheaply. A study by a Keystone Center panel composed of academics, energy analysts, and industry representatives estimated the full cost of new nuclear power at 8-11 cents per kilowatt-hour, which is more than coal, natural gas, biomass, and wind-powered generators (Flavin 2008).

4. Recommended programmes and policy options

The transition to pathways leading to sustainable, low carbon energy systems hinges on renewable energy, improving energy efficiency and consuming less energy. However, it is a complex process requiring consistent policies, strong political will and dedicated support by consumers and other stakeholders. Central to the transformation is adoption of the full cost of energy thereby putting a price on carbon and eliminating fossil fuel subsidies. Currently, only a handful of countries have in place systemic environmental taxation policies to incentivise renewable energy sources. The leading energy users, led by the U.S., China and India, and most other countries, do not yet implement such policies. Policy options engaging energy producers and consumers must be put in place to move forward. Some policy options recognising the barriers and implications of transitioning to sustainable energy pathways are as follows.

4.1 Carbon pricing that increases over time

The transition from fossil fuels to renewable energy should be driven by setting a price on carbon. So far, there are two viable options: carbon tax or the nuanced cap and trade system (including the cap and dividend option being considered in the U.S.). Carbon tax is straightforward and could be implemented under the existing tax structure, but the word "tax" generates a negative perception that it could be an additional burden to the public. Theoretically, the government would place a levy on all forms of carbon, including coal, oil, etc., at the source and then the energy industry would pass along the costs of this tax to consumers. In return, to balance the burden on taxpayers, payroll taxes could be cut to help offset the higher costs of fuel. However, this scheme is dependent on how transparent the government will be in managing the carbon tax and providing sufficiently attractive rebates.

In the cap and trade system, the government sets an overall limit, which reduces yearly, on the amount of CO₂ that could be pumped to the atmosphere. It is an invisible tax and lets the market decide how much carbon reduction should cost. However, based on the EU experience which issued excessive carbon permits making the carbon price fall dramatically, it did not create an efficient carbon market. It also failed to deliver uniform and predictable costs of carbon that could have encouraged more carbon emission reduction and use of cleaner options. Some analysts fear that with carbon trading, only the traders benefit and not the environment.

4.2 Elimination of fossil fuel subsidies

Fossil fuels are heavily subsidised in many countries. Inappropriate energy policies and short-sighted subsidies can be very costly, at a rate of more than \$400 billion per year globally (UNEP 2008). With “cheap, dirty energy” consumers, both industrial and individual, do not have an incentive to save energy or reduce consumption. Accordingly, energy-efficient technologies are also having difficulty penetrating the market. Subsidies for fossil fuel could be diverted to subsidise renewable energy-based electricity generation to stimulate the market to achieve lower production and technology costs.

4.3 Decouple electric utilities’ profits from amount of power sold

Decoupling electric utilities’ profits from the amount of power they sell will give them an incentive to improve energy efficiency and take in renewable energy into their grids. Regulatory reforms will be needed to introduce a mechanism of rewarding utilities for best service at the least cost. This is a win-win-win option for power companies assured of their profit, consumers with reduced power bills and lesser emissions for the environment. This can follow the example in California wherein consumers use less than half as much electricity per person as in other states in the U.S. (Flavin 2008).

4.4 Coordinated renewable energy targets

Coordinated increases in renewable energy targets among countries could help avoid the prisoner’s dilemma induced by increasing the share of renewable energy use. Stronger regional efforts can aid governments in reaching a domestic consensus to strengthen renewable energy promotion following Putnam’s “two-level games” approach (Matláy 1997). For example, on the one hand, since renewable energy is still deemed expensive and developing countries are still behind in technology, it may be difficult to increase its implementation at the domestic level. Governments could then invoke international commitments, such as binding regional coordinated targets and financial assistance from developed countries to convince domestic sceptics. On the other hand, it may also invoke domestic opponents to solicit cooperation and assistance from other countries.

4.5 Engaging household consumers

The efficiency gains from reduced energy use by industry and logistics are threatened to be off-set by the continuously increasing energy use for homes, services and travel. Lifestyle change will be necessary to keep at bay the energy used for pleasure. The Eco-Home Diagnosis is one example of an initiative that supports energy reduction efforts with expectation of real CO₂ reduction, based on the differing lifestyles of individual households. Recognising the lifestyles of individuals in a household, it proposes custom-made effective measures suited to the conditions of each household (IGES 2009).

4.6 Strengthen effort to promote decentralised grids in rural areas

Decentralised grids are a more immediate need that can be addressed by installing stand alone renewable energy sources in rural areas. Capacity development, training and knowledge dissemination activities should come hand in hand with equipment installation. Government support is needed to encourage the private sector to undertake and invest in small-scale renewable energy projects in isolated and electricity deficient areas.

5. Conclusion

There is now a consensus that energy use today is not sustainable. While there is great urgency today to transform to low carbon energy, it is no longer just a question of finding cleaner alternatives from all sources but also of consuming less. While waiting for global or national agreements to manage and regulate the transition, the opportunities made possible by the world of social networks—individuals, consumers, and communities—should be captured and engaged to shape the transformation to sustainability.

However, the transition is not without complications. If implemented in a haphazard way, it may create newer and an equally difficult set of problems. There is no silver bullet solution to our energy problems, but there is a collective mix of pragmatic and doable solutions.

Internalising environmental costs by putting a price on carbon—either through a carbon tax or regulatory cap on emissions—will make renewable energy prices competitive with fossil fuels, thereby reducing emissions from non-renewable power generation. Focusing on current renewable energy policies, feed-in tariffs and renewable portfolio standards (RPS) should aim at higher targets and be given more government support; subsidies should be maintained, if not increased, to the extent granted to fossil fuel industries. Renewable energy should be viewed as a long-term investment not only addressing energy security and energy portfolio diversification but also other environmental and welfare co-benefits. Complementary measures should include more funding to be allocated for R&D as well as capacity building for the next generation of green engineers and technicians.

While the recommendations outlined are mostly top-down policies, their success lies heavily on the participation and adoption of consumers. Simply put, renewable energy technologies need consumers to use its product—sustainably produced electricity—and drive innovation on how it should be more efficiently produced and consumed. It is also the choice of consumers to transcend from wasteful energy consumption to adopt lifestyle changes that support cost-efficient and socio-environmentally friendly cleaner options. Collective decisions will dictate the next pathways towards sustainable energy utilisation. Such decisions will be critical to reduce the threat of climate change to ensure a sustainable future for the next generations.

Notes

1. The full video statement can be viewed at <http://www.un.org/wcm/content/site/climatechange/lang/en/pages/2009summit/statements>
2. Khosla Ventures, the Sand Hill Road clean tech-focused venture fund, raised funds totalling \$1 billion, all dedicated to supporting early clean tech investments, when other sectors are still reeling from the global financial crisis. *Green Energy Reporter*, <http://www.greenenergyreporter.com/tag/vinod-khosla/> (accessed on 10 October 2009).
3. Geoff Colvin. 2007. Chevron's CEO: The Price of Oil. *Fortune*. 8 November 2007.
4. "Black Swan Events" refers to what author Nassim Nicholas Taleb describes in his 2007 book, *The Black Swan*. These are uncommon events that are generally unpredicted but have enormous impact—such as the 2008 financial crisis.

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Chapter 10

Food Safety in the Asia-Pacific Region:
Current status, policy perspectives, and
a way forward

Chapter 10

Food Safety in the Asia-Pacific Region: Current status, policy perspectives, and a way forward

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1. Introduction

Food safety is a global problem threatening the food security of millions of people. The food safety problem is more prevalent in the least industrialised world than in the industrialised world (McIntyre et al. 2009). In the less developed world, unsafe food and water borne diseases are responsible for the deaths of approximately 2.2 million people annually, 1.9 million children amongst them (WHO 2008). Food safety-related health problems, like acute diarrheal illness, affect up to 1.8 million children worldwide in developing countries. Nearly 700,000 people die of food and water safety-related causes every year in the Asia-Pacific region alone (WHO 2004).

Much of these food safety problems can be traced to how we achieved gains in food production over the past few decades. Up until now the major strategy to achieve food security has been the enhancement of food production through the use of chemical inputs, often in excessive quantities, such as pesticides, food additives, hormones, and antibiotics.¹ While this strategy has ensured sufficient quantity of food in the early years of the Green Revolution, eventually it has also resulted in degradation of the natural resource base and food safety related issues. In addition, the poorly managed post-harvest food supply chains, most notably in developing countries, have only added to food safety issues through contamination and food spoilage. Despite this, larger policy actions have still focused on *food quantity issues* rather than *food quality issues*, including food safety. Hence, food safety deserves much greater attention in the ongoing food security discourse and actions than it currently receives.

The issue of food safety has arisen largely due to the way various resources (or inputs) have been employed in production and distribution of food over the years (Rattan et

Chapter Highlights

Food safety is an important issue requiring equal attention to food quantity and access to ensure holistic food security in the Asia-Pacific region. This chapter explores key issues in food safety in terms of sustainable consumption and production.

- Food safety is an issue of sustainable production and consumption in agriculture since both are linked through a web of feedback connections.
- Organic agriculture provides an important opportunity to promote food safety, although it is not the only answer.
- A combination of policies and actions including integrating food safety standards, policy coordination with relevant stakeholders through a lifecycle approach, producer and consumer capacity building, and better storage infrastructure are necessary to bring needed safe food security to the Asia-Pacific region.
- The research on food safety is at a nascent stage in the Asia-Pacific region and needs encouragement to contribute to policy processes and holistic food safety.

al. 2002; Waltner-Toews and Lang 2000) and hence is deeply related to sustainable consumption and production (SCP). Although organic agriculture in general and certified organic agriculture in particular have, to a certain extent, sought to provide freedom from using chemical inputs and food free from harmful levels of chemicals, they suffer from being limited to niche markets (e.g., among the affluent and health conscious) due to issues related to scaling up and prices. Hence, there is a need to look at other means of achieving food safety, while simultaneously addressing the issue of organic agriculture, so that all people can have access to safe food at affordable prices. Promoting SCP practices and policies in agriculture (that would enable a balance between quantity and quality aspects of food) may provide such an opportunity.

Keeping the above in mind, this chapter looks at the current food safety issues in the Asia-Pacific region and aims to identify associated causal factors. The chapter also discusses existing food safety policies and practices, with a view to identifying ways to address current food safety issues. While food safety is relevant to food from both plant and animal sources, this chapter deals with only plants, as plant food still forms the largest source of calories in the world, especially in the developing world (FAO 2008). Further, since organic agriculture has long been considered as one of the means of achieving increased food safety, an attempt has been made to analyse its potential and identify some challenges, and to suggest a way forward towards greater food safety in the Asia-Pacific region.

2. Food safety and sustainable production and consumption

Food is considered to be unsafe if it is likely to cause physical harm to the person consuming the food (Australia New Zealand Food Authority 2001). This may be the result of food being damaged, deteriorated, or perished, or if the food contains damaged, deteriorated and perished food or non-food items. Other impacting factors may include food having originated from an animal that has previously been diseased or died other than by slaughter, or if the food contains a biological or chemical agent or other substances that are foreign to the food. The food can turn unsafe due to the way it is produced or handled at various stages of food production and processing, storage, transportation, marketing and consumption (Australia New Zealand Food Authority 2001). Figure 10.1 indicates the food safety issues at various lifecycle stages of food production, processing and consumption.

Figure 10.1 Lifecycle stages of food production and related food safety issues

Lifecycle Stages	Production	Transport	Processing/Storage	Supply outlet	Cooking/Consumption	Disposal
Food Safety issues	<ul style="list-style-type: none"> • Chemical residues • Contamination 	<ul style="list-style-type: none"> • Spoilage, Contamination 	<ul style="list-style-type: none"> • Preservatives/additives, enzymes etc. • Spoilage • Contamination 	<ul style="list-style-type: none"> • Spoilage • Contamination 	<ul style="list-style-type: none"> • Spoilage • Contamination 	<ul style="list-style-type: none"> • Contamination

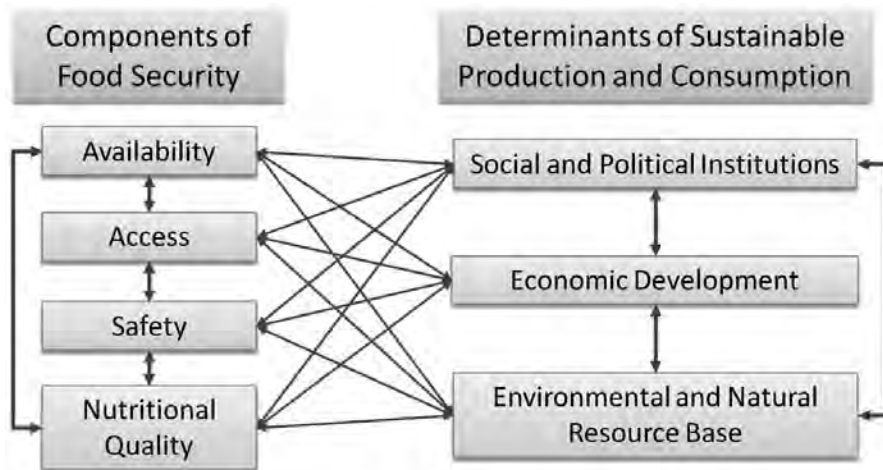
Source: Authors

Food safety is essential to achieving holistic global food security and is one of the most serious challenges facing mankind in the 21st century. However, in order to realise holistic global food security, it needs to be viewed within the broader ambit of SCP, at the very heart of the concept of sustainable development.²

Unsustainable patterns of production and consumption were identified as reasons behind the continued deterioration of the global environment as far back as 1992 (United Nations Department of Economic and Social Affairs 1992). This applies to agriculture and food safety along with production and consumption of a range of industrial goods. Food safety is intrinsically linked to the sustainable methods of production and consumption. SCP cuts across the whole consumption and production cycle of food, encompassing all ways for improving how products and materials are sourced, manufactured and marketed, and the way that products are purchased, used and disposed at the end of their useful lives (Joel and Deborah 2003). SCP therefore seeks to balance environmental, social and economic goals. Food safety forms a key element of the social desirability of the production and consumption cycle of agricultural goods.

The way this chapter situates food safety in the overall concept of food security and how it is related to sustainable production and consumption is shown in Figure 10.2. As indicated earlier, food security has multiple dimensions which include the quantity of food that determines the food availability in the market, and the quality of food that determines the nutritional and safety aspects of the food. Access to food is often determined by socio-economic and political factors. As shown in Figure 10.2 food security, and hence food safety, is determined by the very same determinants that determine SCP through an intricate web of inter-linkages with feedback effects; any efforts targeting SCP or food security will have some impact on the other. Hence, we propose that food security and food safety issues should be given greater importance in SCP because these issues share the same fundamental basis and are intricately linked to one another.

Figure 10.2 Conceptual diagram showing linkages between food security, food safety and sustainable consumption and production (SCP)



Source: Authors

3. Current food safety situation in the Asia-Pacific region

3.1 Background on food safety problems

During the later 1800s and most of 1900s, lack of sufficient quantities of food was the overriding concern in global food security. The focus of the Green Revolution from the 1960s onwards was therefore upon boosting production and making sufficient quantity of

food available. This period was also characterised by rapid mechanisation of agriculture, first occurring in developed countries and later spreading to developing countries, with the greatest impact occurring from the late 1960s onwards (Kyuma 2004). This trend further accelerated large scale farming with mono-cropping, modern agricultural machinery, and intensification of inputs such as high-yielding varieties, chemical fertilisers, pesticides, and irrigation (Evenson and Gollin 2003). Significant increases in production were achieved in staple food crops such as wheat, maize, rice, and potato serving as the principle food source for billions of people worldwide. As a result, in the 30-year period from 1960 to 1990, the global grain production doubled, managing to outpace the world population, which has grown 1.6 times (FAO 2009; FAO 2008).

However, food security gains have not come about without a cost. Intensification of agricultural production with modern inputs and excessive use of chemical fertilisers and pesticides caused agricultural productivity to stagnate, or even decline in some regions, and inflicted serious environmental damage such as soil degradation, resource depletion and biodiversity loss (Pretty et al. 2001). Agricultural intensification has also given rise to serious food safety concerns that range from pesticide contamination of water and food, toxic residues found in food to antibiotic resistance due to excessive use in intensive animal production industries (Gold 1999; FAO 2004). Inefficient infrastructure for storage, handling and processing of food combined with weak institutional support for ensuring food safety are other factors that exacerbate post-harvest food safety issues in many countries.

Some new and emerging trends in the food industry are an additional cause of concern for food safety in the Asia-Pacific region. These emerging trends include changing consumption patterns such as increasing the proportion of calories from animal sources, globalised food production and supply chains challenging conventional and obsolete food safety regulations, genetically modified organisms including bioengineered crops, infectious diseases spreading from animals to human being (e.g., bovine spongiform encephalopathy or mad cow disease), *Escherichia coli* O157:H7 in fruit and vegetable production, avian influenza (bird flu) from eating infected chicken, and food irradiation. Food safety strategies cannot ignore these trends but must address them in a comprehensive manner.

3.2 Food security and food safety

Whilst world food production has increased over the years, barring a few annual fluctuations, to become sufficient enough to feed all, its distribution and access has not been uniform across all countries and all sections of society. This is primarily due to a multiplicity of factors such as poverty, economic and political systems, conflict, and the failure of adequate food security policies of governments, fluctuating input prices, and changing consumption patterns (Hans 2008; FAO 2008; Benson et al. 2008). As one of the developing regions of the world, the Asia-Pacific region now has 542 million people suffering from hunger, out of a global hungry population of 1.02 billion (FAO 2009; FAO 2008). To meet this challenge, the United Nations Millennium Development Goals (MDG) set a target of halving world hunger by 2015. However, progress so far has been only marginal in the Asia-Pacific region, with South Asia performing poorly, and a slightly better performance in East Asia (United Nations 2008). These countries are also vulnerable to other factors impinging on food security such as lack of uniform access and safety of food (FAO 2009; FAO 2008; United Nations 2008). These other concerns therefore, deserve far greater attention and action in light of the MDGs, whose achievement would require not only increasing global food production but more importantly, ensuring its quality, safety, and access in the poorer regions of the world. In view of the critical importance of food safety for overall food security, the Rome Declaration on World Food

Security has identified food safety as one of the major challenges in achieving world food security (FAO 1996). Food security is of ever growing importance to determining global peace and stability in the 21st century (FAO 2008; FAO 2002).

3.3 Some statistics related to food safety

In the Asia-Pacific region, food safety is a grave concern. A brief look at some of the recent food safety related news in this region is useful for developing a better understanding of the current situation (Table 10.1). Recent food safety issues originating in China and elsewhere remain an immediate concern to many food safety observers globally. In most of the cases presented in Table 10.1, the vulnerable sections of society to food safety related concerns tended to be those considered to be economically disadvantaged and marginal sections of the population. Most affected were children (infants, school-aged children), people dependent upon commercial food outlets, areas with animals and human beings co-existing in close areas, and those inhabiting areas with dense populations (slums) and heavy pollution (industries).

Table 10.1 Examples of food safety related hazards reported in the Asia-Pacific region

Country	Food safety related hazards	Reference
Bangladesh	1,657,381 cases and 2,064 deaths from food contamination reported in 1998.	FAO 2004
China	300,000 infants sickened by tainted milk formula in 2008.	Fred and Buzby 2009
India	8,000-10,000 of food safety related cases annually and above 1,000 fatalities. Food contamination with pesticide residues such as DDT.	Battu, Singh and Kang 2004; Bhushan 2006
Republic of Korea	7,909 food poisoning cases reported in 2003.	FAO 2004
Thailand	120,000 food poisoning cases reported annually.	FAO 2004

Source: Authors

Major food safety issues relate to how food is produced, processed, stored, marketed and consumed. The main factors affecting food safety are, but not limited to, improper use of chemicals such as pesticides, hormones, additives, and preservatives in food production and processing and improper handling of food during storage and consumption, especially amongst poor households living in unhygienic environments. These issues have been further compounded by the gradual increase in food prices that has led to the deterioration in access to safe food, and a lack of proper regulations and subsequent enforcement mechanisms. Inappropriate use of pesticides in the food production system, reflected through excessive use, and improper applications in the field have contributed to increased chemical residues in food sources resulting in additional food safety issues across the Asia-Pacific region. As an example, India uses only about 0.31 kg pesticides per hectare in comparison to 17 kg in Taiwan and 13.1 kg in Japan, but still reports a higher number of cases of pesticide residues in food and drinks (Business Line 2009). In such cases, rather than the amount of pesticides applied, its improper application methods (timing of application and types of pesticides) are more important causes for a country's food safety issues. The same may not hold true in the case of other countries like Indonesia where excessive use, among other issues such as use of banned chemicals, is a major concern (Inside Indonesia 2009; Murphy et al. 1999; Dewi and Pertiwi 2006; Lesmana and Hidayat 2008).

4. Current policy environment and its limitation in the Asia-Pacific region

A recent global report by a consortium of institutions such as the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD), United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), United Nations Educational, Scientific and Cultural Organization (UNESCO), The World Bank, World Health Organization (WHO), and the Global Environment Facility (GEF) has identified that much of the food safety problems in the least developed world is due to the lack of effective food regulation and safety protocols (McIntyre et al. 2009). Hence, in this section, an effort has been made to look at the current policy environment in the Asia-Pacific region.

The policy options and actions for promoting food safety in the Asia-Pacific region can be broadly categorised into regulatory and non-regulatory instruments. Of all regulatory instruments, food safety standards and certification are the most important. Within food safety standards, one category of standards is general food safety standards that are applicable to a wide range of general food types. Another category of standards is specific food production standards and certification systems, such as organic food standards, that are often applied much more stringently than general food safety standards and often cover the entire food production lifecycle.

Non-regulatory policy instruments include institutional and technical capacity building including establishment of food safety testing laboratories, cold storage and transportation facilities, food safety reporting and monitoring systems, and generating greater awareness of food safety amongst producers and consumers. Food safety standards and certification systems that help ensure strict adherence to safe food practices receive relatively more attention in this chapter, with consideration also given to a number of other policy options.

Figure 10.3 presents various food safety policy options and actions targeting the various lifecycle stages of food production and consumption.

Figure 10.3 Various policies and practices promoted for food safety in the Asia-Pacific region

Lifecycle Stages	Production	Trans- port	Processing/ Storage	Supply outlet	Cooking/ Consumption	Disposal
Food safety issues	<ul style="list-style-type: none"> • Chemical residues • Contamination 	<ul style="list-style-type: none"> • Spoilage, Contamination 	<ul style="list-style-type: none"> • Preservatives/add itives, enzymes etc. • Spoilage • Contamination 	<ul style="list-style-type: none"> • Spoilage • Contamination 	<ul style="list-style-type: none"> • Spoilage • Contamination 	<ul style="list-style-type: none"> • Contamination
Policy options & actions	<ul style="list-style-type: none"> • Organic agriculture • Standards & certification 	<ul style="list-style-type: none"> • Appropriate storage 	<ul style="list-style-type: none"> • Organic food • Food standards & certifications • Cold storage • Personal hygiene 	<ul style="list-style-type: none"> • Food standards & certifications • Personal hygiene 	<ul style="list-style-type: none"> • Personal hygiene 	<ul style="list-style-type: none"> • Personal hygiene • Composting

Source: Authors

4.1 Regulatory mechanisms

National food safety laws and regulations

In order to establish and implement a comprehensive food safety system, it is necessary for a country to enact and enforce appropriate laws and regulations. Food safety standards can be defined as the requirements and practices for food producers, manufacturers, handlers, processors, food supply outlets and food consumers for the purpose of ensuring food safety in terms of hygiene and health.

While several countries in the region have food safety laws and regulations in place (Table 10.2), in general, the prevalence and enforcement of national food safety standards for commonly consumed food in the Asia-Pacific region are at a very primitive stage. Many countries do not have comprehensive regulations covering the entire food range, while in other cases, despite the existence of comprehensive regulations, implementation is poor due to a multiplicity of implementing agencies and resulting inefficiency and conflicts. For example, in some countries such as Japan and China, there is a multiplicity of acts and regulations governing various aspects of food safety often making them difficult to implement (Yang 2007; The Information Service Center for Food and Foodways 2005).

Table 10.2 Examples of main food safety laws in select Asia-Pacific countries

Country	Food Safety Laws and Programmes	Implementation agency
Australia and New Zealand	Australia New Zealand Food Standards Code	Food Standards Australia New Zealand
China	Food Safety Law (2009)	State Food and Drug Administration
India	Food Safety and Standards Act (2006) Food Safety and Standards Bill (2006) Prevention of Food Adulteration Act (1954)	Food Safety and Standards Authority of India
Indonesia	Act of the Republic of Indonesia number 7 of 1996 on food; Government regulation of the Republic of Indonesia number 28/2004 on food safety, quality and nutrition	National Agency for Drug and Food Control (BPOM)
Japan	The Food Safety Basic Law (2003); Food Sanitation Law (1947); Agricultural Chemicals Regulation Law (1948); The Law Concerning Standardization and Proper Labeling of Agricultural and Forestry Products ("JAS Law") (1950)	Food Safety Commission
Malaysia	Hazard Analysis and Critical Control Point (HACCP) Certification	Ministry of Health
Thailand	Food safety programme	National Bureau of Agricultural Commodity and Food Standards, Ministry of public health

Source: Ministerial websites of respective countries

While in others, like India, there are specific chemical control regulations such as the Insecticides Act (1968) governing import, manufacture, sale, transportation, distribution and use of insecticides for agricultural production purposes, as well as a general food safety regulation in the form of the Prevention of Food Adulteration Act (1957) implemented by multiple ministries, which has led to inefficiency. From 2006 onwards, a new food safety law, the Food Safety and Standards Act (2006), which is based on

the Codex Hazard Analysis and Critical Control Point System (HACCP) and EU Food Directive, has been enacted and aims to improve the efficiency with which the food safety is implemented in the country (Baruah 2008).

Food production, processing, and marketing systems range from small- to large-scale, with products passing through multiple tiers of handlers and middlemen in the market chain (Othman 2007). A range of difficulties are reported in enforcing national food safety laws and standards. The first is the choice between obligatory and voluntary systems. Wherever national standards are obligatory, it has been difficult to effectively introduce regulatory systems due to the large number of processes and people engaged in the food supply chain from production to marketing. For example, in the case of India, the currently proposed national food safety standards do not apply to the whole range of actors involved in the food industry, such as hawkers and small petty shops. At the same time, the food safety standards in countries such as Indonesia have made little difference in achieving food safety due to their voluntary nature. Further, establishing and periodically updating food legislation and identifying and addressing gaps among the various regulations for food, imports, exports, and hygiene are necessary steps in the establishment and implementation of an effective food safety system as exemplified by the weakness in Standard Nasional Indonesia (SNI) standards of Indonesia that cover only agricultural food (FAO 2002).

While most of the standards in the region are country-specific, an example of integrated/collaborative food safety codes and standards is found in Australia and New Zealand that share common food safety laws called the "Australia New Zealand Food Standards Code." An initiative to remove barriers to trade between two countries, this collaborative food safety standard is unique and has provided impetus to food trade between these two countries. Such collaborative food safety standards are worth exploring in other developing countries in the Asia-Pacific region where food trade has been growing at a rapid pace.

Organic certification

Food safety begins first at the on-farm production level. In agricultural production, agricultural chemicals form the single most important safety concern, both during their use in production and at subsequent stages. Different agrochemicals with different withholding periods are used before planting, during crop growth, and in post-harvest during storage and transportation. The potential for debilitating impacts of these chemicals on the environment, users, and food consumers has been widely publicised and discussed amid calls for alternative agricultural production practices (Jayaratnam 1990; Roitner-Schobesberger et al. 2008). Some of the important and widely advocated alternative practices include organic agriculture and low-input agriculture including conservation farming. Table 10.3 provides a comparison between these forms of agriculture.

Table 10.3 Comparison between intensive, organic and low input agriculture*

Component	Intensive agriculture**	Organic agriculture***	Low input agriculture
Inputs	Both organic and inorganic including pesticides and fertilisers.	Usage is strictly restricted to organic inputs with no use of synthetic pesticides and fertilisers.	Need based usage of a combination of organic and inorganic fertilisers, including synthetic substances.
Decision making	Based on set notions and traditional practices.	Based on strong decision support tools, including soil and plant testing etc.	Based on soil and plant testing.
Prevalence	Wide spread.	Growing but still insignificant.	Growing and also found in transitional areas from conventional to organic.
Support	Largely supported by national and local policies, including subsidies.	There has been growing recognition for promoting organic agriculture in the Asia-Pacific region.	Supported in Indonesia and mostly coupled with conservation tillage in India, Pakistan, Nepal, and Bangladesh.
Environmental impacts	Largely negative.	Largely positive.	Transitional in nature.

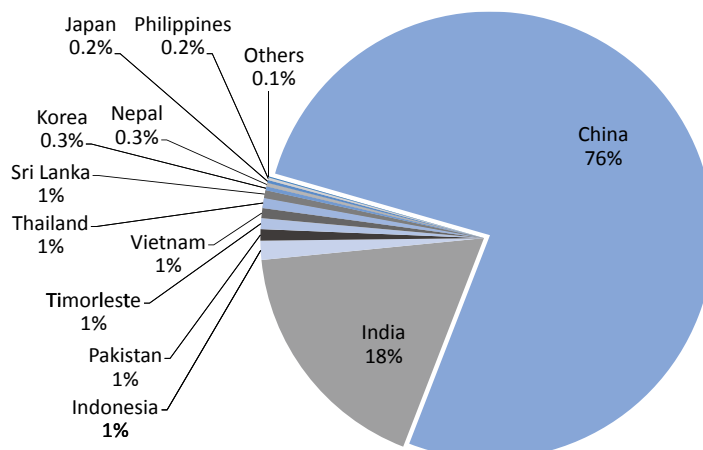
Notes: * Several other forms of agriculture are possible when these forms are combined in different stages, for example, as in case of organic and low input agriculture (OLIA). However, this table identifies only those forms which can be clearly distinguished for comparison purposes.

** Often referred to as inorganic agriculture, conventional agriculture, etc. in different situations.

*** Often also referred to as ecological agriculture.

Source: Authors

The area under organic agriculture world-wide has more than doubled since 2000 (McKeown 2009). Several countries in the Asia-Pacific region practice organic agriculture (Miller, Youssefi-Menzler and Sorensen 2008), with China accounting for 76% of total area under organic agriculture in the region (Figure 10.4). Although the market scale is still small compared with the United States or Europe, organic products sales in Asia have been expanding at a rate of 15-20% per year, fuelled partly by concerns over food safety (McKeown 2009). Meanwhile, the EU's updated organic regulations in January 2009 that simplified imports of organic products are also expected to give a greater opportunity to potential exporters to the EU (IFOAM EU Group 2009).

Figure 10.4 Share of organic agriculture areas in different countries in the Asia-Pacific region

Source: Willer, Youssefi-Menzler and Soren 2008

In addition to the high export potential of organic food to developed countries, there is also sizable demand for organic food within the developing world. As an example, about 30% of organic produce produced in India is consumed within the country (Carroll 2005; International Trade Center 2007) and China's domestic organic food demand is growing at an annual rate of 30% (Sheng et al. 2009; Sternfeld 2009; International Trade Center 2007). Similar growth in domestic organic food demand can be observed in Thailand (International Trade Center 2007). Much of this demand is due to rising disposable income levels, rapid urbanisation, and growing health concerns (Sternfeld 2009; Carroll 2005; Roitner-Schobesberger et al. 2008; International Trade Center 2007).

One reason why organic agriculture is receiving greater attention today is due to the diverse environmental, social, and economic benefits that it provides (Miller, Yusefi-Menzler and Sorensen 2008; FAO 2007). Some prominent benefits offered by organic agriculture include higher yields when compared to conventional agriculture,³ less on-farm energy use due to reduced fertiliser use; enhanced environmental services such as high soil moisture holding capacity and nitrogen fixation; high farming viability due to less reliance on off-farm inputs; resilience to yield fluctuations; soil stability; promotion of agro-biodiversity; climate change mitigation; improved food quality, nutrition, and health benefits; improved water quality (especially of ground water); and promotion of local biodiversity (FAO 2007). Organic agriculture is beneficial to both the growers, who otherwise would be handling harmful chemicals, and to the consumers who consume relatively chemical free food. In this sense, organic agriculture provides an opportunity to improve food safety at the production level itself.

Organic food certification programmes have been the prominent regulation system implemented in the Asia-Pacific region for exporting organic food to the developed country markets (Sano and Prabhakar 2010).

Table 10.4 provides an overview of organic certification systems in the region. It is apparent that many countries in the region have identified special agencies for promoting organic food with governmental regulations/standards in place in most cases. Apart from these, there also are leading standard setting agencies that offer principles and guidelines for certification processes, such as Codex Alimentarius (Codex) and International Federation of Organic Agricultural Movements (IFOAM).

Table 10.4 Organic certification standards and institutions in select countries in the Asia-Pacific region

Country	Government agency	Governmental regulations/standards	No. of private certification agencies	Other certifications offered
Australia	Australian Quarantine and Inspection Service	National Standard for Organic and Bio-dynamic Produce	7	JAS, IFOAM, USDA Organic, etc.
China	Organic Food Development Center of China	China National Organic Product Standard (2005)	33	NOP, OCIA, JAS, EU, etc.
India	Agricultural and Processed Food Products Export Development Authority (National Program for Organic Production, National project on organic farming)	Indian national standards for organic products (2001-05)	12	EU, NOP, Codex, DAP Germany, etc.
Indonesia	Badan Standardisasi Nasional (Indonesia's national standard agency), Otoritas Kompeten Pangan Organik (Organic Food Competent Authority)	Indonesia National Standard number 01-6729-2002	2	IFOAM, JAS, EU, etc.
Japan	Japan Agricultural Standards	Japan Agricultural Standards of Organic Agricultural Products	55	-
Republic of Korea	National Agricultural Products Quality Management Service, Korean Food and Drug Administration (Transaction Certificate for Processed Organic Products)	Certification standard based on Environmentally Friendly Agriculture Promotion Act (1997)	33	-
Malaysia	Skim Organik Malaysia, Department of Agriculture Sarawak	Skim Organik Malaysia (national organic standard, MS 1529:2001)	1	EU, NOP, JAS, etc.
Philippines	Organic Certification Center of the Philippines, Bureau of Agriculture, Fisheries and Product Standards	Philippine National Organic Standards for Crop and Livestock Production	1	-
Thailand	Organic Agriculture Certification Thailand	National Organic Standard Guideline for Crop Production	2	EU, JAS, Codex, NOP, etc.
Vietnam	Ministry of Agriculture and Rural Development	Organic Agricultural Production Standards	2 (International)	-

Source: Modified from Sano and Prabhakar 2010

The promotion of organic agriculture in the Asia-Pacific region faces two main challenges: high transaction costs for certification and low credibility of organic products (Sano and Prabhakar 2010). Reasons for high transaction costs for organic certification include the high cost of certification itself, especially for small production volumes that result in higher unit costs. Other factors contributing towards high transaction costs include limited

sales channels for organic products, multiple organic certification standards followed by different countries in the region, dominance of private certification bodies, and lack of capacity to implement national certification systems.

Organic agriculture faces many challenges and associated limitations. One of the major limitations of organic food is its inability to reach most of the population that is vulnerable to food safety issues (most importantly, the less economically advanced sections of the society) as it is often offered at premium prices and is therefore costly (Roitner-Schobesberger et al. 2008; Wei 2009; FAO 2007). Even if organic food is made affordable through price subsidies, for example, the potential to produce organic food for all (replacing all forms of food from inorganic agriculture) may be limited in satisfying growing food demand in the near future.⁴ In addition, it should be noted that not all organic food is equal. The broader environmental benefits of organic food could be undermined in a global economy where much of the organic food is being imported from far distances and is produced in resource intensive production systems (Foster et al. 2006). Taking the above factors into consideration, it can be reasonably concluded that organic food alone cannot be the only answer for addressing food safety problems in the Asia-Pacific region. Hence, there is a need to take a two-pronged approach which includes promoting general food safety in the region through other means such as promoting environmentally friendly sustainable forms of agriculture, while promoting organic agriculture as an alternate system of production.

Harmonisation of food safety regulatory systems

Much of the global organic food demand is in the developed world and organic food exports from developing countries are on the rise. More than 50% of fruits and vegetables, sugar, non-alcoholic beverages, fish and fishery products are exports from developing countries (Bureau of Agriculture and Fisheries Product Standards and DA-RFU-13 2008). With different importing countries requiring exporting countries to adhere to different organic food standards, often organic food exporters in China, India, Thailand, and Indonesia have to adhere to multiple certifications (Table 10.4). Internationally, food safety standards such as good agricultural practices (e.g., EUREP GAP standards set by EUREP GAP, a private sector body that sets voluntary standards for certification of agriculture products around the world), good manufacturing practices like ISO 9000, and Hazard Analysis and Critical Control Points (HACCP) have been developed. Such multiple standards and certifications often result in high overhead costs and delays in processing and transportation of produce due to certification requirements and other government regulatory delays (Sawyer, Kerr and Hobbs 2008) thus often limiting the access to international markets by developing countries due to insufficient capacity to meet multiple certification requirements imposed in foreign markets.

While such multiple standards not only hinder exports acting as technical barriers to trade, they could also delay the expansion of domestic markets since importing countries, including some developing countries, impose requirements that the imported organic food adhere to their own domestic organic food standards, as in the case of China (Sternfeld 2009). In order to expand the organic food market and access to organic food, there is an urgent need for countries in the region to harmonise their domestic systems with international ones. To address the issue of inefficiency in the organic market, an international initiative called the International Task Force on Harmonization and Equivalence in Organic Agriculture (ITF) was launched by the collective efforts of the Food and Agriculture Organization (FAO), the IFOAM and the United Nations Conference on Trade and Development (UNCTAD) in 2003 and harmonisation tools have been developed.

Harmonisation of certification standards is primarily aimed at promoting trade. However, the benefits of enhanced trade in promoting organic agriculture and resultant food safety should not be underestimated. Further, it should be noted that most of the international standards were developed based on the experiences and expertise in developed countries and any harmonisation efforts should take into consideration the limited capacity in developing countries and to involve them in the harmonisation process. The ITF process has produced two significant recommendations, i.e., a reference system for countries and bodies to accept outside certifications (International Requirements for Organic Certification Bodies), and a tool for assessing the equivalence of different standards (EquiTool). In addition, the process has identified the IFOAM and Codex Alimentarius Commission as the basis on which further harmonisation can be achieved. Despite these efforts, progress has been less than successful due to issues such as differing legal formats and administrative systems, varying political systems and the influence of national attitudes and concepts of sovereign rights (WHO and FAO 2006).

4.2 Non-regulatory mechanisms

Promotion of sustainable production practices

Sustainable agricultural production that seeks to harmonise agricultural production with the natural environment by making use of and controlling natural biological cycles, and by reducing intensive application of inputs such as chemical fertilisers and pesticides can play an important role in ensuring food safety in developing countries of Asia-Pacific. As discussed earlier, excessive application of chemical fertilisers and pesticides has given rise to food safety issues, such as nitrate contamination and toxic residues in food. Sustainable agricultural practices, such as those listed below, can improve the natural soil fertility and reduce the need for increasing amounts of chemical inputs and thereby play a vital role in tackling the problem of food safety in the Asia-Pacific:

- Conservation agriculture with practices such as conservation tillage or no-till, residue retention, and mulch plowing (McIntyre et al. 2009)
- Crop rotation and intercropping with nitrogen fixing leguminous crops
- Adequate application of organic manure
- Fallowing to allow soil to regain its fertility
- Controlling the flooding of rice paddy fields and promotion of practices such as intermittent flooding and mid-season drainage (can control nitrate leaching and groundwater pollution)
- Integrated pest management using biological controls and cycles
- Promotion of agro-forestry or diversified farming practices (Mihara and Fujimoto 2007)

These sustainable agricultural practices can substantially improve the soil quality and productivity (McIntyre et al. 2009) by improving its chemical, physical and biological properties, restore its nutrient balance, reduce soil erosion, and augment farm incomes thereby reducing the need for intensive application of chemical fertilisers and pesticides that are a threat to food safety. However, there has been limited progress in promoting these practices due to slow extension and adoption programmes hindered by limited funding, incentive schemes, and poor technology targeting (The World Bank 2008). To date, high-yielding variety seeds and fertilisers form the most widely adopted technologies. Part of the problem can be attributed to insufficient investments in agriculture (Prabhakar and Elder 2009; Ministry of Finance 1999), both public and private, hindering development and transfer of technology to farmers.

Various ways to promote these sustainable agricultural practices include financial incentives like preferential subsidies, preferential taxation and grants, support for distribution, marketing and sale of sustainably produced produce, agricultural extension services and eco-labelling to aid in consumer decision making.

Institutional capacity to monitor and enforce food safety standards

Trained and competent food inspectors are vital in ensuring consistent, transparent, and effective food inspection. In addition to the establishment of food safety regulatory systems, institutional capacity to implement such systems, as well as associated supporting components such as food safety monitoring systems, testing laboratories and labelling systems, need to be built up. Most developing countries in the Asia-Pacific region severely lack the capacity to develop and implement safety standards and regulations. This is indicated by the fact that only 34% of developing member countries have participated in the Codex Alimentarius Commission meetings, that is 10% less than the participation level from developed countries. In addition to this, the ratio of developed and developing countries that previously submitted pesticide residue data to the commission in 2003 stood at 90:10 (FAO 2004). To illustrate this point further, India has only one laboratory that is capable of testing pentachlorophenol (used as herbicide/insecticide) concentrations complying with international food safety standards for export (European Union 2009).

To address the issue of limited capacity to implement and monitor food safety regulations, international initiatives are providing technical assistance to developing countries. For example, the Standards and Trade Development Facility (STDF), established by FAO, WHO, World Organization for Animal Health (OIE), World Trade Organization (WTO) and The World Bank, helps developing countries in establishing and implementing various international agreements aimed at food safety (Othman 2007). However, these initiatives have yet to show fruitful results on the ground as reflected by the large number of food safety cases reported in the region discussed in previous sections.

Producer capacity

Building up producers' capacity to properly handle food and manage risks is vital to food safety. Developing countries face myriad bottlenecks, including the lack of knowledge and expertise on new and modern technologies and practices, little appreciation for good hygienic practices, good agricultural practices, and good manufacturing practices, especially among small-scale food processors including street food vendors, and lack of in-house controls based on the HACCP system.⁵

Consumer capacity

With the rapid evolution of new forms and disappearance of traditional forms of food, it is often difficult for consumers to keep abreast of the new changes and to be aware of associated food safety issues. Food safety cannot be ensured if consumers fail to gain matching capacity to assess safe food consumption. In many developing countries, sharing information, education, and advice among stakeholders across the farm-to-table continuum is limited and awareness campaigns on food safety, and education materials for consumers and the food industry are needed (Othman 2007). Consumer awareness needs to be based on a holistic understanding of how the food is produced and how it should be consumed so that adverse impacts are minimised (Tukker et al. 2008).

Consumer decision making can be greatly helped through food labelling which is still in nascent stages in many developing countries (Please refer to chapters 2 and 8 on packaging and tropical forest trade for more discussion on labelling related policy tools.) Most of the time, food labelling is implemented along with food certification standards. Since a large portion of food being sold in retail markets in the Asia-Pacific region is neither packaged nor certified, it is often difficult to implement a stand-alone labelling system that just lists the nutritional and food safety characteristics of the food. This is also the case with domestically grown and marketed organic food that does not go through proper certification procedures (Carroll 2005). Food that is grown and sold directly by producers, such as in farmer markets, also belongs to this category. It is a challenge to implement a uniform food labelling policy in such diverse farm production and unorganised marketing conditions.

Infrastructure and food preservation

Post-harvest activities are an integral part of the food production system in order to offer high quality and safe food to consumers (FAO 2009). Post-harvest infrastructure plays an important role in safe post-harvest handling of food by reducing spoilage and contamination during storage and transportation. Hence, with reference to food safety, infrastructure refers to the facilities used in transporting and storing food in a hygienic manner. Food storage and transport infrastructure facilities are still inadequate for satisfactory food safety in many countries of the Asia-Pacific region (Central Institute of Post Harvest Engineering and Technology 2008; Rabo India Finance 2007). Despite the fact that refrigeration decreases food spoilage and occurrence of food-borne diseases, only a small proportion of food is preserved in cold storage, chilled or frozen in developing countries, as opposed to more than 50% of foodstuffs in developed countries (Pineiro, Barros-Vela'zquez and Aubourg 2005). As a result, an estimated \$12 billion worth of food is being wasted in India every year (Rabo India Finance 2007), about 10-40% of food is spoiled in transport depending upon the commodity (Central Institute of Post Harvest Engineering and Technology 2008), and about 25-40% of fruits and 20-25% of vegetables produced are lost due to spoilage during post-harvest mishandling in India, thus reducing the per capita availability considerably. Access to cold storage and supply chain systems in the Asia-Pacific region is hindered by high costs, unstable power supply systems and relatively negligible food processing.

To summarise, the following issues highlight the food safety situation in the Asia-Pacific region.

1. Several efforts have already been undertaken to improve the situation of food safety in the Asia-Pacific region. However, these efforts are undermined by a multiplicity of standards, laws and regulations governing food safety. Limited capacity to implement and enforce these standards has led to limited success.
2. Organic agriculture can provide a vital opportunity to promote food safety but it alone cannot solve the problem completely.
3. There is a critical gap in producer and consumer capacities in handling and consuming food in a safe manner. This gap is widened by a lack of proper decision support systems.
4. Other capacity constraints such as lack of transportation and storage infrastructure endanger food safety, while also impacting food availability.
5. There is vast experience available in the region in promoting environmentally friendly food production practices, including sustainable agricultural practices. However, the spread of these practices is hindered by lack of aggressive incentives and disincentives.

5. Policy suggestions and way forward

We propose a parallel and mutually complementary two-pronged strategy for promoting food safety in the Asia-Pacific region: continuance of support to organic agriculture, while promoting other means of food safety in the region.

5.1 Promoting organic agriculture

Organic agriculture provides an important avenue to make safe food available. Promoting organic agriculture must be part of the food security and safety policies of governments in the region. Organic agriculture can be promoted by reducing the costs involved in certification. Harmonisation of standards and certification systems provide several benefits such as transparent market access conditions, low cost of compliance and low vulnerability due to the presence of alternative markets (Maier 2006). As seen in the previous section, many countries in the region follow different general food safety and organic certification standards, resulting in high overhead costs. Several efforts have already been made in harmonising food safety standards without much success. International joint food standards programmes, popularly termed as Codex Alimentarius, were established by FAO and WHO in order to promote safe import and export of food products as a part of the Sanitary and Phytosanitary (SPS) agreements under the WTO. These standards are to be adhered to by the member states of the WTO who intend to export and import food products. However, developing countries have failed to fully adhere to these standards. An important hurdle in harmonisation has been the lack of receptivity of national ministries to the idea of harmonisation due to the costs involved in modification of existing standards and institutional systems.

While there has been significant emphasis on organic certification, more attention is needed on organising organic producers in the region and providing them with needed training in organic production practices, such as composting and microbial preparations, and better packaging. Government training should be enhanced in participation with the private sector. One of the important issues in adoption of organic agriculture has been poor organic yields in the initial years of adopting organic agriculture. Additional financial incentives in terms of production inputs during these initial years are crucial for higher adoption rates. Additional support is also needed in storage infrastructure, increasing access to remote domestic and international markets through cooperatives, making available better information on domestic and foreign markets and price trends, inclusion of organic agriculture know-how in government extension programmes, incentives for adequate production and availability of organic inputs such as organic manure and organic pesticides.

5.2 Promoting general food safety

Policies to pursue sustainable production and consumption by improving food safety will need an effective combination of regulatory (command and control) and non-regulatory systems, such as market/information-based measures, along with measures to increase technological and human capacity. A combination of decision support tools based on sound principles of the lifecycle approach, a well-deployed package of incentives and disincentives supported by policy coordination, and producer and consumer capacity building activities, including support for better post-harvest infrastructure, forms an essential component of the second prong.

Lifecycle approach in food safety

The lifecycle approach can provide a robust and holistic framework for promoting food safety, since such an approach can effectively link various phases of food production until the food is consumed (McIntyre et al. 2009). Linking of production and consumption domains at the policy level is important but challenging because many agencies are involved in the production and consumption phases and in implementing food safety. Coordination among these agencies is often poor in some Asia-Pacific countries (Othman 2007). However, as the food industry matures in developing countries, an integrated food safety system consisting of both regulatory and non-regulatory measures as appropriate for the context would be able to narrow the risk of breach and close the loopholes for unsafe practices.

In addition, for more developed economies, making inventories of lifecycle assessment will become useful beyond food safety to further advance policy making towards more sustainable food policies. Furthermore, the lifecycle approach can be extended to the production stage for promoting sustainable production such as those relating to manure management, pesticide and fertiliser use. However, it should be noted that pushing resource use efficiency alone may not prove effective as it could have a rebound effect (Cohen 2009). Therefore moving from product and process improvements to human and social well-being and redefining the contemporary understanding of prosperity and quality of life are essential.

As the food industry matures in developing countries, an integrated food safety system, both regulatory and non-regulatory measures appropriate to the context would be able to narrow the risk of harm and close the loopholes for unsafe practices.

Better coordination among agencies, nations, and policies

Food safety policies will not be effective if other related policies such regulations on chemical use are not coordinated. Malaysia sets a good example in terms of establishing a good coordination system between the Ministry of Health and Ministry of Agriculture and Animal Husbandry through a network system called the Food Safety Information System of Malaysia (FoSIM). Establishing food safety information systems, on the lines of FoSIM, could help in streamlining food safety regulation procedures by connecting the importers, enforcement authorities and traders. In this system, all importers need to be registered in the system database, advance notification is given by the importer to the food safety authorities about the food consignment, and food safety analysis results are posted on the system to be readily accessed by the importers. Such a system would also enhance transparency and speed up the process of food importing, thereby reducing the risk of food spoilage. Countries in the region should have robust agrochemical safety management systems so that agro-chemical manufacturers label the chemicals in a proper manner helping rural farmers with appropriate use, leading to reduced chemical residue issues (McIntyre et al. 2009). Better coordination is also required in order to better monitor and regulate food safety related concerns. Such international coordination could help provide timely surveillance and responses.

Incentives and disincentives

Combined with the lifecycle approach mentioned above, economic incentives or disincentives could be given to food producers to promote food safety measures. Some possible incentives could include:

- Targeted farm subsidies (prevention of negative externalities): A comprehensive evaluation of the impact of current subsidies on overuse of certain agro-inputs and inputs used in other forms of food production is necessary to reduce market distortion and harmful farm chemicals. For example, a recent policy development in Indonesia is aiming to remove price subsidies for fertilisers and move towards direct compensation to farmers' groups.
- High Value Added Tax (VAT) on food products with high environmental impacts (e.g., meat) (Tukker et al. 2008): As meat production is often supported through large subsidies for grain and water, a "food conversion efficiency tax" could be an option (Myers and Kent 2003; Hines et al. 2008).
- Price incentives for safe food: For such a system to work there is a need for a robust monitoring and evaluation system that keeps track of the performance of different food producers (farmers and firms) supported by a food labelling system so that appropriate incentives can be handed over to them depending on their performance in promoting food safety.
- Other forms of incentives such as matching grants for soil conservation could help in long term improvements in natural resources with food safety co-benefits (The World Bank 2008).

Producer capacity building

Building producer (including food industry and trader) capacity to practice food safety measures is essential to maximise the effectiveness of the lifecycle-based approach. In many developing countries where the food industry is still under development, the government's role in demonstrating good examples and supporting good practices is important. Promoting public-private partnerships could be effective not only in introducing and upgrading storage and transportation infrastructure but also in streamlining logistics along the lifecycle of the supply chain.

Small farmers deserve special attention since capacity development could be slower at the farming stage, which is dispersed and unorganised, than at mid- and downstream areas of the food industry (Reardon et al. 2009). In doing so, farmers can organise cooperatives to introduce and improve the product grading systems in collaboration with wholesalers, in addition to their food safety practices, such as farming techniques that improve food safety and sustainability (organic/low-input and integrated pest management) and other techniques (rice flooding, conservation tillage or no-till, residue retention). Capacity building strategies tailored to national conditions are vital (Sano and Prabhakar 2010).

Research and development can also be facilitated by either government initiatives or public-private partnerships. Reliable scientific information on food safety is one of the pillars to ensuring food safety (Othman 2007). In addition to the capacity building of domestic small and medium enterprises, encouraging large corporations to raise food safety management skills would also be an important and effective approach. One study conducted in China proposes a model in which supermarkets, food suppliers, and rural farmers work together to guide small-scale rural farmers to enter the supermarket supply chain for the sake of improving safety and providing quality food in China (Hu 2006). Also, the Food Handlers' Training Program being implemented in Malaysia since 1996 aims at implementing a one-day training programme on basic aspects of food safety (hygiene and handling) (FAO 2004). There is a great need for such training programmes to be conducted in other parts of the Asia-Pacific region.

Consumer awareness generation

Consumer decisions need to be based on a holistic understanding of how food is produced and how it should be consumed so that the impacts are minimised. As a minimum requirement, sufficient information, such as the source of food, ingredients and how to cook, store, and consume food should be detailed on food labels. Most food safety administration agencies in developing countries are resource starved and often are not able to monitor adherence to regulations. Food labelling that can help trace food sources can help in effective implementation of food safety regulations.

In addition to the provision of necessary information through labelling, public educational programmes on food safety and other basic information on food such as sources of food, ingredients, and methods of preservation would be vital for many developing countries. Educational campaigns can be organised with the food industry as a form of public-private collaborative effort. A brand-neutral generic advertisement found in the United States, sanctioned by the government but funded by the industry, to increase the domestic demand for commodities like beef, pork, milk, and flowers, may be a useful means to carry campaigns on food safety to the general public. In Japan, in addition to the required basic information in the labels, some agricultural products carry names and pictures of the growers to have better communication with potential consumers expressing their confidence in the products grown by farmers on a voluntary basis.

For more developed countries, campaigns on raising food safety or sustainable consumption in a broader context need to be tailored to address consumers in a more specific manner. Although it is common that health issues are a main driving force for food safety, a study conducted in the United States shows that income, demographic characteristics, attributes and behaviour related to the environment and health did not significantly affect the attitudes and behaviours related to food and preference for local food (Zepeda and Li 2006). Similar observations were made in a survey on consumers' attitudes towards environmentally-friendly agricultural products conducted in Japan in 2007. The Japanese survey results showed that consumers value convenient locations for such items more than prices and tastes/nutritional values (MAFF 2007); whereas in Norway two-thirds of Norwegian households never buy organic food because they are sold in sparsely located specialised shops (United Nations 2008).

6. Conclusions

Food safety is an important component of food security for billions of people suffering from hunger and malnutrition in the Asia-Pacific region. Just like food security, there is no single solution for achieving food safety but several well-coordinated efforts are required at the national, regional and international levels. A two-pronged strategy has been suggested in this chapter to promote food safety in the region: to promote organic food, while also continuing to promote general food safety practices across all forms of food.

One of the major constraints in promoting organic food has been the multiplicity of standards and certification systems that are developed based on understanding and expertise from developed countries. Such fragmented institutional and regulatory systems have been far from effective in realising safe food security in the region and hence urgent attention to harmonise standards is required. Among other aspects reviewed in this chapter, urgent attention is required for producer and consumer capacity building, putting in place appropriate monitoring and regulatory systems that are well coordinated with not only other food quality and food security policies, but also post-harvest food infrastructure

facilities, such as transportation and storage facilities and training of food handlers and consumers on the safe handling of food.

Food safety and sustainable consumption and production are intricately linked. The trends observed in earlier sections of the chapter call for a pragmatic and holistic approach to the problem of unsustainable production and consumption for the current generation and generations to come. This means that one should look into the principles of SCP and try to incorporate them in every step of food production and consumption. A lifecycle approach could help in achieving this task. However, as simple as it may sound, operationalising the lifecycle approach in the area of food safety could be a daunting task since several agencies are involved at various stages of food production, processing, transportation, storage and marketing—as such, coordination among them is a critical function. Achieving food safety will remain a challenging task as long as these agencies continue to formulate policies independent of each other, necessitating policy coordination at all levels.

Food safety issues often surface at the consumer level. Fast disappearing local forms of food, the introduction of new forms of food, and the prevalence of unorganised food markets are a challenge to informed decision making by consumers. In this area, more research and experience sharing is required on how to implement food information and labelling systems in the least costly manner. Since some of the food safety issues could be linked to unsustainable forms of food consumption, redefining the contemporary understanding of prosperity and quality of life could be an essential ingredient for safe food security.

Food safety issues in the Asia-Pacific region are complex and demand additional research on various emerging trends in food production and consumption. The following are some potential areas for further research:

- Climate change is known to impact on food production (both crop and animal) and hence the way the food is produced and consumed. This could lead to changes in food choices that people would have to make with potential food safety consequences needing unconventional approaches to the potential problems.
- While organic agriculture could contribute to both mitigation and adaptation aspects of climate change, research is far from conclusive on how much organic agriculture can feed the hungry. Hence the call for additional empirical research in this area.
- The Asia-Pacific region is witnessing a rapid change in its socioeconomic conditions with associated changes in the sources of food and food consumption patterns. There is a dearth of research in this area for policy makers to make informed decisions.
- A comprehensive study is needed on how farm subsidies are altering the production and consumption of inputs used in farming with potential impacts on food safety.

Notes

1. This suite of practices is often referred to as the “Green Revolution” technologies.
2. Sustainable development has been defined as “...development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission on Environment and Development 1987).
3. On average, global organic yields are calculated to be 132% higher than the conventional production levels.
4. There are conflicting reports on this issue. While some reviews state that organic agriculture can feed the world (Vasilikiotis 2000; Badgley et al. 2007), others seem to indicate possible low productivity levels when compared to high input inorganic farming or during transition periods to organic agriculture (FAO 2007).
5. Science-based system that identifies specific hazards and control measures to ensure the safety of the food commonly adopted in the food industry around the world (Othman 2007).

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Section IV

Focus on Crosscutting and Transboundary Issues

Chapter 11 takes a crosscutting approach to climate issues in Asia by focusing on two important sectors – buildings and transportation. The importance of these sectors is amplified by trends in emerging Asia, most of all rapid urbanisation and the consumption patterns and lifestyles of the urbanised populations. In focusing on sustainable consumption this chapter demonstrates the necessity of research on the linkages between consumption and climate change in the Asia-Pacific region – in particular in the building and transport sectors. The authors support their position with cases and analysis on trends in energy demand and GHG emissions in these sectors in the region. An interesting theme in the structure of this chapter is the back-and-forth the authors go through in discussing mitigation opportunities and the potential obstacles which may be encountered. The recommendations include effective solutions for consumers, producers, and the government with emphasis on the roles of multiple stakeholders from the international to the local level – depending on the most suitable mix for the context. As with many of the other chapters in this White Paper this chapter focuses more on the sustainable consumption aspect of SCP.

These themes of multistakeholder involvement and cooperation from the local to the international level suggested in Chapter 11 are recurrent throughout this White Paper. Chapter 12 on regional cooperation highlights some thought-provoking issues on these and other issues for SCP in the Asia-Pacific region. While a fundamental aspect of SCP and sustainable development on the whole is decoupling social and economic development from material throughput, measures taken for SCP should not be assessed only on the results in the country they originated in but also on how the measures contribute to SCP in other countries and regions. The authors find that there has been a lack of policy research on SCP issues from a regional perspective and aim to fill this gap with three quantitative case studies based on original IGES research. These studies encompass regional implications of Japanese SCP policies to achieve a low carbon society, issue of emissions embodied in international trade, and the potential for cross-border energy infrastructure development to promote sustainable energy consumption. Key messages of this chapter indicate that in the worst case, one country's efforts to promote SCP in that country could have adverse effects towards the broader aims of SCP. Another key message of this chapter, and of the White Paper overall, is to emphasise careful consideration of context when looking for solutions to production and consumption issues. Drawing on their careful analysis the authors caution that promoting SCP domestically may be neither efficient nor effective in some cases, given the context and conditions present. By drawing on three distinct, yet complimentary case studies, this chapter gives a unique – and timely- perspective on SCP in the Asia-Pacific region.

Chapter 11

Sustainable, Low-carbon Buildings and
Transportation: Climate imperatives in
urbanising Asia

Chapter 11

Sustainable, Low-carbon Buildings and Transportation: Climate imperatives in urbanising Asia

Maricor D. Muzones, Eric Zusman, Frank Hiroshi Ling, Hitomi Kimura and Takuro Kobashi¹

1. Introduction

How can a rapidly urbanising Asia pursue a sustainable, low carbon development path? This chapter seeks to provide some answers to this question. The chapter demonstrates that there are few studies exploring the link between sustainable consumption and climate change in Asia. It then suggests that understanding this relationship is critical in the region because unsustainable lifestyles and consumption behaviour could dramatically increase the region's energy use and greenhouse gas (GHG) emissions.

The relationship between sustainable consumption and climate change also merits greater understanding because many of the world's low cost GHG mitigation opportunities involve policies that promote sustainable lifestyles and behaviour in two of Asia's fastest growing sectors: buildings and transportation. With the region's rapid urbanisation, timely, if not early, action in these sectors is critical not only to avoid the lock-in of unsustainable development driven by carbon-intensive technologies but a "lock in" into unsustainable lifestyles and systems of services provision as well. Moreover, from a climate perspective the transformation of energy consumption in these two sectors will be crucial to help keep global temperature rise within 2 degrees Celsius above pre-industrial temperatures. This chapter discusses these opportunities and how barriers to realising them can be overcome at the local, national and international levels.

The chapter is divided into six sections. The next section reviews international policymaking processes and research that has begun to link sustainable consumption

Chapter Highlights

This chapter seeks to present how a rapidly urbanising Asia can consume more sustainably through low carbon lifestyles and practices, particularly in two of the most carbon-intensive sectors: buildings and transport. In doing so, key stakeholders in the buildings and transport sectors must recognise and work towards removing the barriers on the following:

- Managing the consumption of energy services in the buildings and transport sectors will be a key challenge for sustainable consumption and low carbon growth in Asia.
- Government support through subsidies and informational campaigns can help to accelerate deployment and drive economies of scale for energy efficient technologies and practices in the buildings sector.
- Public works like bus rapid transit (BRT) and district heating and cooling (DHC), which can only be carried out by the government, are critical to energy and fuel efficiencies.
- International frameworks under the UNFCCC and bilateral and multilateral exchanges can be extended to climate goals as well as sustainable development.

and production (SCP) and climate change. It also demonstrates why there is a need for more research on the relationship between these two issues in Asia, particularly in the buildings and transportation sectors. The third section presents the trends in energy demand and corresponding GHG emissions in these sectors. The fourth and fifth sections outline a number of mitigation opportunities related to sustainable lifestyles and behavioural patterns as well as obstacles to realising them in the buildings and transport sectors. The final section concludes with recommendations for integrating sustainable consumption into international climate negotiations and other international policy processes as well as integrating climate concerns into consumer-oriented policies at the national level. The entire chapter focuses chiefly on the sustainable consumption component of SCP.

2. Sustainable consumption and climate change in urbanising Asia

The importance of SCP came to international prominence in Agenda 21 at the United Nations Conference on Environment and Development (UNCED 1992) and Johannesburg Declaration at the World Summit on Sustainable Development (WSSD 2002). The WSSD, for example, characterises changing consumption and production patterns as essential to sustainable development, while Agenda 21 indicates that changing consumption patterns can make energy use in key sectors more sustainable. A few years after the release of Agenda 21, climate change entered into the discussions over SCP in a background paper that the Commission on Sustainable Development (CSD) prepared for the Marrakech Process (CSD 2006). More recently, SCP has drawn attention from climate change negotiators from developing countries who have criticised developed countries for their unsustainable lifestyles and consumption patterns (UNFCCC 2009).²

While the link between SCP and climate change has been made recently in international policymaking processes, for over a decade researchers have noted that sustainable lifestyles and behavioural changes can reduce energy use. Goldemberg (1996), for example, has argued that most of the strategies that promote sustainable energy futures have dealt with technical solutions such as switching from fossil fuels to renewable energy, but a less studied strategy is to change energy and fuel intensive *consumption patterns and lifestyles*. Herring and Sorrell (2009) have also endorsed a lifestyle-centred approach, cautioning that improving energy efficiency alone may not be as effective in reducing energy demand as generally assumed. This is due to the “rebound effect” wherein improvements in energy efficiency that reduce the marginal cost of energy services such as travel can lead to an overall increase in the consumption of those services. De Zoysa (2009) has taken this logic one step further and given it a regional focus, arguing that it is important for developing countries in Asia to integrate sustainable consumption criteria into regional and national policies, including climate policies.

While there have been efforts at the national level to enact policies and measures to address SCP (see Table 11.1 for examples from the buildings and transportation sectors), much remains to be done to significantly reduce energy use and achieve a substantial GHG emission reduction.

Table 11.1 Examples of national SCP policies and measures in transport and building sectors

	Policies/Measures	SCP
Transport		
India	The National Conservation Strategy and Policy Statement on Environment and Development (transport)	Outlines government's goals and projects for achieving sustainable lifestyles and the proper management and conservation of resources.
China	Consumption tax	Promotes the consumption of smaller, more efficient and less polluting cars through tax exemption grants.
Indonesia	Vehicles Emission Standard for Road Worthiness	Sets the limit for carbon monoxide and HC emissions for vehicles to pass road worthiness test.
Singapore	Weekend Car scheme	Introduced before the implementation of the road pricing scheme, it aims to provide further incentive to reduce frequency of vehicle use (e.g., a car owner who participates in this scheme receives a rebate and only pays 30% of the normal road tax).
Buildings		
China	National Energy Efficient Design Standard for Public Buildings (2005)	Sets target at 50% energy reductions compared to pre-existing buildings; targets to be achieved by improving energy use in the building (22%) and performance of the air conditioning system (28%).
	Green Building Evaluation Standard (2006)	Provides standards to quantify the sustainability of buildings using energy consumption data; Ministry of Construction awards a certificate for buildings that pass certification criteria.
Thailand	Energy Codes for "Designated Buildings" and Government Buildings (1995)	Sets envelope, heating and lighting standards for large designated and public buildings; requires energy audits for existing buildings.
ASEAN	ASEAN Regional Energy Benchmarking of Buildings; Regional Energy Efficient Building Award Programs	ASEAN-sponsored programmes to benchmark energy efficient buildings and reward best practices.
India	Energy Conservation Act	Provides for the legal framework, institutional arrangement and a regulatory mechanism to promote energy efficiency; includes energy efficiency programmes for government buildings, development of energy conservation building codes, a standards and labelling programme for electrical appliances, education and awareness campaign to promote energy conservation; and provided the basis for the 2001 Energy Conservation Building Code.
	Energy Audit Program (2007)	Establishes an audit programme for all buildings over a specified connected load.
	National Green Building Rating System	Considering establishing a voluntary system for builders and individuals.
	Pilot Programme of Renewable Energy in Buildings	Demonstrates renewable energy application (i.e., solar) on buildings.
Indonesia	National Master Plan for Energy Conservation (2005)	Forms part of strategy to reduce energy intensity by 1% per year; requires energy intensive buildings to undergo an energy audit.

Source: WRI SD-PAMs Database 2009; and Huang and Deringer 2007

There are several reasons that sustainable consumption and climate change deserve more attention in a rapidly urbanising Asia. For several decades, the region has been the fastest growing economic region, except for the financial crisis in 1998. This growth in Asia has been underpinned by large scale urbanisation. Table 11.2 shows the region's projected urbanisation trends from 1950 to 2030. With urbanisation, changing consumer preferences are driving much of the increase in energy use in Asia. And while technologies will help deliver the much needed emission reductions from the buildings and transport sectors, policies targeting lifestyle or behavioural change at the end-user's level will be crucial in reducing emissions in these sectors.

Table 11.2 Urbanisation trends in Asia 1950-2030

	GDP per capita (PPP,\$) 2003	Population (million) 2005	Urban Population (million) 2005	Proportion Urban			Estimated Increase in Urban Population	
				(%) 1950	(%) 2005	(%) 2030	(million) 2005–2030	(%) 2005–2030
World		6,453.6	3,172.0	29	49	61	1,772.7	56
Asia		3,917.5	1,562.1	17	40	55	1,102.2	71
Malaysia	9,512	25.3	16.5	20	65	78	10.8	66
Thailand	7,595	64.1	20.8	17	33	47	14.6	70
China	5,003	1,322.3	536.0	13	41	61	341.6	64
Philippines	4,321	82.8	51.8	27	63	76	34.8	67
Sri Lanka	3,778	19.4	4.1	14	21	30	2.4	59
Indonesia	3,361	225.3	107.9	12	48	68	80.0	74
India	2,892	1,096.9	315.3	17	29	41	270.8	86
Viet Nam	2,490	83.6	22.3	12	27	43	24.5	110
Pakistan	2,097	161.2	56.1	18	35	50	79.3	141
Cambodia	2,078	14.8	2.9	10	20	37	5.8	197
Bangladesh	1,770	152.6	38.1	4	25	39	48.4	127
Lao PDR	1,759	5.9	1.3	7	22	38	2.3	177

GDP = gross domestic product, Lao PDR = Lao People's Democratic Republic, PPP = purchasing power parity, PRC = People's Republic of China.

Sources: United Nations, *World Population Prospects: The 2002 Revision; World Urbanization Prospects: The 2003 Revision*; and United Nations Development Programme, *Human Development Report 2005*.

Source: ADB 2006

Urbanisation has indeed brought hundreds of millions out of poverty, but at the same time, has ushered in a consumer economy based on Western patterns of consumption which, as Chapter 1 explained, are completely unsustainable. Between 1950 and 2005, the world's urban population expanded from 29% to 49%. For the first time in human history, more people are living in cities than in rural areas. By 2030, the population living in cities will reach 61%, an increase of nearly 1.8 billion with most of them in Asian developing economies. The urbanisation trends and their resulting increases in GHG emissions stand in contrast to the levels that science suggests are necessary for properly addressing climate change.

The Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC)-Working Group III has stated that a global temperature increase of 2 degrees Celsius above the pre-industrial level should not be exceeded in order to avoid dangerous influence on the planet's climate. This 2-degree target was subsequently built into the Copenhagen Accord in 2009. Reductions of up to 80% in emissions are needed to meet this goal, although current commitments fall far short. Thus, there is a critical need to move away from today's energy and fossil fuel intensive consumer-driven economy in order to properly address the climate problem.

While trends in energy use deserve attention, another dimension of the relationship between sustainable consumption and climate change is just as important. This second dimension reflects the fact that per capita energy consumption and associated GHG emissions of many countries in Asia are still significantly lower than the world average of 1.82 tonnes of oil equivalent (toe) and 4.38 tonnes CO₂ equivalent, respectively, in 2007. In fact, the per capita energy consumption of India and Indonesia is several times below that average with 0.5 toe and 0.8 toe, respectively. Additionally, the region's per capita electricity generation is estimated at 1,800 kWh, still 37% below the world average of 2,870 kWh (ADB and APEC 2009). More alarming is the fact that about 1.5 billion people or about 22% of the world's population still do not have access to electricity (IEA 2008). Of this number, more than half live in India, Indonesia and Bangladesh, and more than 85% live in the rural areas. As they migrate to urban areas, energy demand will increase significantly.

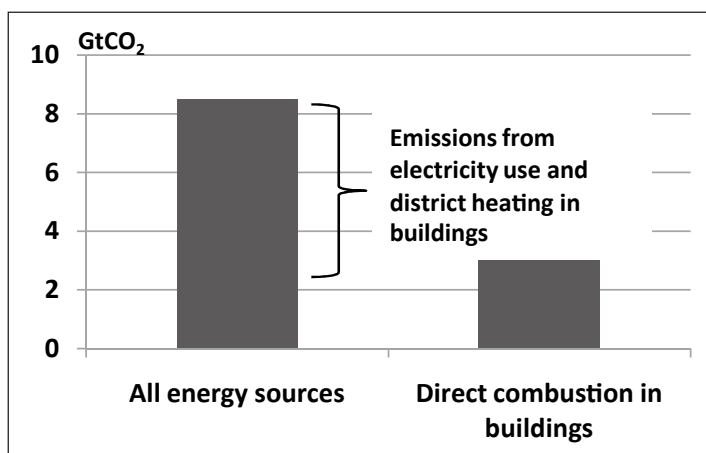
The region's lack of access to energy points to key considerations and possible tensions. For much of Asia, increased energy use will be essential to achieving basic development needs. Although Asia's rapid economic growth has lifted more than 350 million people out of poverty, increased energy use will be needed to reduce the proportion of underweight children, eradicate extreme poverty and hunger and reach other Millennium Development Goals (MDG). Indeed, since the Asia-Pacific region is home to more than half of the global population with the largest number of people in poverty, adequate provision of energy will be integral to regional and global poverty relief efforts (UN-DESA 2002). Therefore, it is important that policies for mitigating GHGs also enable Asia to pursue a low carbon development path that does not deprive the region of urgently needed development.

While researchers and international policymaking processes have advocated policies promoting sustainable consumption to address both development and climate change, progress on the ground has been limited. One of the few studies tracking SCP strategies such as eco-labelling finds that they are still constrained in their ability to motivate meaningful changes in consumer behaviour (Cohen 2008). This is partly because SCP strategies need to take a systems approach, one that considers actions within social structures and seeks to carry objectives through the production and consumption chain and into the social and physical infrastructure in which consumption takes place (European Environmental Bureau 2009). But it is also because studies on the barriers to promoting the system changes needed for sustainable low carbon lifestyles and behaviour are limited. The remainder of the chapter will consider not only the potential for low carbon consumption and development, but how obstacles to realising it can be overcome in the buildings and transport sectors in Asia.

3. Trends in building and transport emissions in rapidly urbanising Asia

3.1 Buildings

Buildings are responsible for almost 40% of global energy use and about 30% of global GHG emissions (UNEP 2009). In 2004, emissions from the residential and non-residential buildings sector (including electricity use) amounted to 8.6 GtCO₂eq from CO₂, 0.1 GtCO₂eq from N₂O, 0.4 GtCO₂eq from CH₄ and 1.5 GtCO₂eq from halocarbons (including CFCs and HCFCs). Figure 11.1 shows the carbon emissions from energy use in buildings. It demonstrates that emissions from electricity use and district heating at the user level account for more than three times the amount of CO₂ from direct combustion of fossil fuels. The importance of the user level is also supported by data showing CO₂ emissions through electricity use in buildings increased annually at 2% from 1971 to 2004.

Figure 11.1 CO₂ emissions from buildings, 2004

Source: Levine, et al. 2007

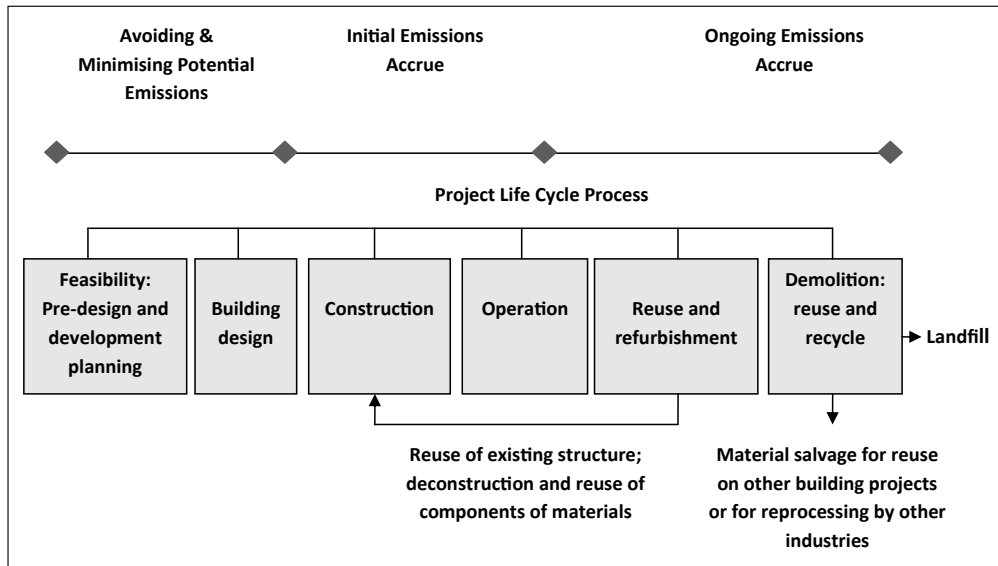
Urbanisation trends in Asia suggest there will be a dramatic increase for energy services in residential and commercial buildings. For example, commercial energy consumption is currently 14 times higher in developed than in developing countries. Moreover, energy consumption by commercial buildings is projected to be the highest-growing end use sector for energy in developing countries (EIA, US 2008). The buildings sector encompasses a wide variety of structures, including residential buildings like family homes and multi-family complexes, and commercial buildings such as shopping malls, high-rise offices, and refrigerated warehouses. In both residential and commercial buildings, the end-uses of energy can be roughly broken down into heating, cooling, refrigeration, lighting, appliances and electronics. These end-uses primarily rely on electricity but for various heating needs they may also require natural gas and oil.

In China, buildings account for almost 25% of the country's total primary energy consumption as well a quarter of its annual GHG emissions. With about 45% of China's population living in urban areas and projections for 60% of the population to be urban by 2030, a significant increase in the buildings' demand for energy services is very likely (Li 2008).

Growing GHG emissions from buildings are mainly driven by increasing electricity consumption. With total primary energy demand in the region projected to increase from 4,025.3 Mtoe in 2005 to 7,215.2 Mtoe in 2030, this translates to growth in per capita energy demand that is 50% higher than the 2005 level (ADB 2009). Per capita electricity demand projections likewise show an increase from 1,344 kWh in 2005 to 2,530 kWh in 2030 with an annual growth rate of 2.6% (ADB 2009). Developing Asia's CO₂ emissions from electricity use for commercial buildings is higher than all other regions. On the other hand, residential buildings are likely to account for the largest regional increase of CO₂ emissions at 42%.

Figure 11.2 shows the life cycle phases of buildings as presented by Graham (2003). Using a life cycle approach, trends show that the operational phase of a building by far accounts for the greatest proportion of energy use. Energy consumption during this phase depends on a wide range of interrelated factors which include climate and location, level of demand, supply and source of energy, building design and construction materials, and the level of income and behaviour of its occupants (UNEP 2009).

Figure 11.2 Life cycle phases of buildings

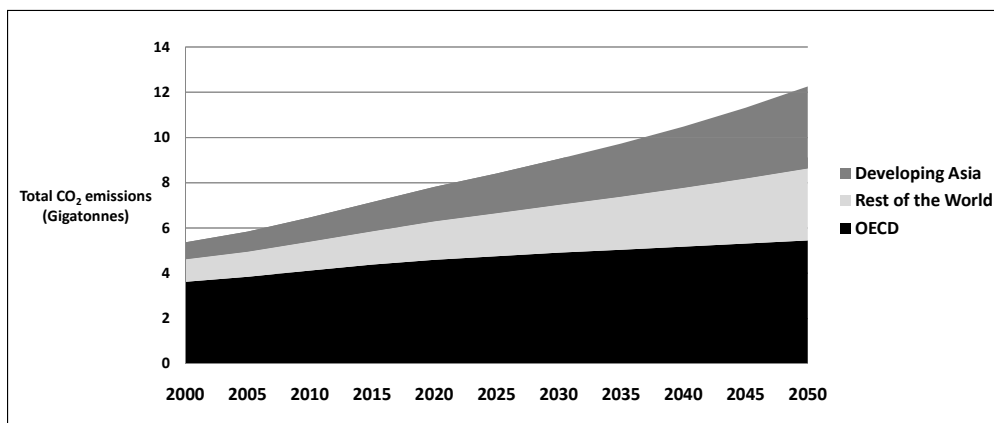


Source: UNEP 2009

3.2 Transport

Economic development, population growth and urbanisation have also contributed to a sharp rise in GHG emissions from the transport sector. The transport sector accounts for nearly a quarter of the world's CO₂ emissions from fossil fuel combustion and 13% of overall GHG emissions (IEA 2008). Between 1970 and 2005, global transport-related GHG emissions grew 130%, with much of the recent growth coming from a rapidly motorising Asia. For example, Asia's transport-related CO₂ emissions increased more than three-fold from 0.21 to 0.76 gigatonnes of CO₂ between 1980 and 2005 (Timilsina and Shrestha 2009).

But while Asia's transport emissions increased significantly in recent years, they could rise even faster in the future. Final energy demand for Asia is estimated to grow 2.2% annually from 2005 to 2030. Within these final demand figures, an estimated 2.9% annual growth for transport is forecast to outpace all other sectors. Moreover, as demonstrated in Figure 11.3, rapid growth in the sector's energy use will make developing Asia increasingly responsible for the world's transport-related CO₂ emissions. In 2000, developing Asia contributed 14% or 0.75 gigatonnes of the world's total transport-related CO₂ emissions—by 2050, transport-related emissions in the region are projected to reach 30%.

Figure 11.3 Total CO₂ emissions from the transport sector (2000-2050)

Source: WBCSD 2004

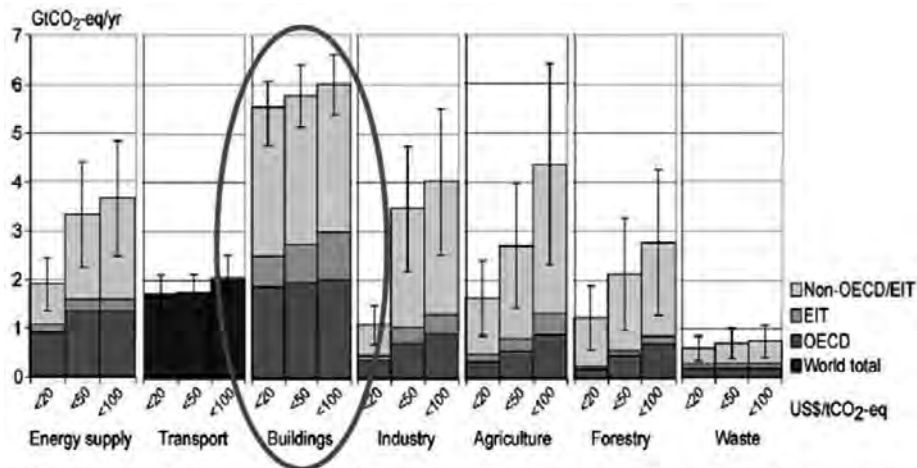
Transport emissions are a function of the volume of transport activity, the amount of energy by each type of activity, the type of fuel used to generate that energy and the mix of modes. The way that Asia's policymakers manage these four variables—particularly energy consumed by type of vehicle and the amount of overall vehicle activity—will influence future emissions. For example, the World Business Council on Sustainable Development (WBCSD) has found that an 18% improvement in per unit energy consumption will not be enough to offset an anticipated 123% increase in transport activity for light duty vehicles by 2050 (WBCSD 2004). This finding is particularly relevant for Asia since countries such as China could see vehicle stocks increase from 37 million in 2006 to 270 million in 2030 (IEA 2007).

The dramatic rise in the number of vehicles suggests policymakers in Asia must not only seek to make each vehicle more efficient but identify strategies that curb travel demand without sacrificing mobility and access. There are many opportunities to achieve this balance in Asia's transport sector. The next section demonstrates that for both transport and buildings most of these opportunities are not only low carbon but also low cost.

4. Mitigation opportunities and barriers in the building and transport sector

As shown in Figure 11.4, the good news is that compared with other major emitting sectors, the buildings sector has the greatest potential for delivering reductions in GHG emissions and at the least cost using currently available technologies (UNEP 2009). Levine et al. (2007) concluded that there is a global potential to reduce approximately 29% of the projected baseline emissions by 2020 cost-effectively in the residential and commercial sectors, the highest among all sectors studied in their report. The estimated energy savings of at least 75% is expected to come from new buildings through a systems approach application in building design and operation.

Figure 11.4 Estimated economic mitigation potential by sector and region



IPCC AR-4: Estimated economic mitigation potential by sector and region using technologies and practices expected to be available in 2030. The potentials do not include non-technical options such as lifestyle changes. (WGIII Figure SPM.6)

Source: UNEP-SBCI 2009

Rapid growth of new buildings in developing countries and the low rate of replacement of energy-inefficient buildings are major contributors to emissions from the buildings sector. The WBCSD recommends that governments, businesses and individuals aggressively reduce energy use in new and existing buildings to reduce emissions by 77% or an estimated 48 gigatonnes (against a 2050 baseline) to stabilise atmospheric CO₂ concentrations at the level called for by the IPCC (WBCSD 2009).

The key to altering the region's GHGs is identifying and taking advantage of affordable abatement opportunities. Studies have demonstrated it is economically and technically feasible to reduce global emissions by 35% from 1990 levels and 70% from 2000 levels by 2030. Reductions of these magnitudes would keep the world within a two degree increase of pre-industrial temperatures (McKinsey 2009).

Utilising marginal abatement cost curves to identify low cost mitigation options has attracted interest because they can demonstrate which sectors and interventions have the lowest cost mitigation opportunities. For example, these studies have demonstrated that the main sectors with mitigation costs below \$90 per tonne globally in 2030 are the energy supply and industrial sectors (17 GtCO₂e), forestry and land sectors (12 GtCO₂e) and the waste, transport, and buildings sector (12 to 14 GtCO₂e). The transport and building sectors are particularly noteworthy because 3.7 to 5.1 GtCO₂e of the potential estimated reduction 12 to 14 GtCO₂e comes from more sustainable consumption practices like those listed in Table 11.3 (McKinsey 2009). Indeed, Levine et al. (2007) has reminded us that understanding which technologies/end uses entail the lowest unit abatement costs for society, as well which ones offer the largest abatement potential, would be crucial from a policy-design perspective.

Table 11.3 Low cost reductions from sustainable consumption

Sectors	GtCO ₂ e per year in 2030	Assumed reductions
Buildings	1.5	-2% change in HVAC -20% change for water heating; appliances; and lighting -20% reduction in floor space for new buildings
Transport	0.5	-Consumers: smaller cars, driving more efficiently, driving less -Commercial-increased travel capacity, improved travel planning
Transport (Air)	0.2	-20% reduction in travel
Mode shift	0.2-0.4	-5-10% road shift by switching to rail, bus, walk, or cycle
Agriculture	0.6-1.8	-20% reduction in meat consumption in the developed world; replace 0-50% meat from cattle, goats and sheep with other meat
Spill-over effects to industry	0.8	-15% cement buildings -10% iron and steel -5% steel buildings -5% steel transport

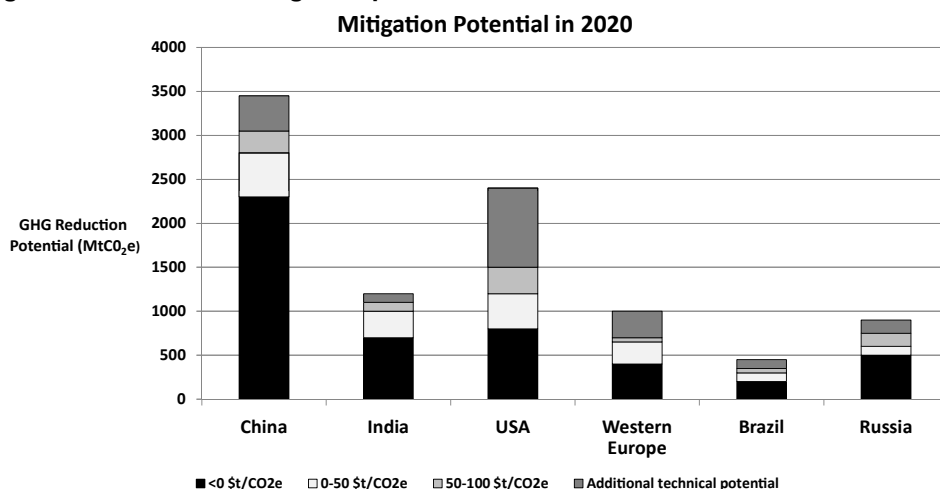
Source: McKinsey 2009

Beyond the fact that many of these opportunities involve changing behaviour and lifestyles, there are two reasons that actions in these sectors tend to be low cost. The first refers to the energy saved over the lifetime of the investment. In some cases, the energy costs saved over time can be greater than the “cheaper” standard technology to which the option is compared, thereby making the low carbon alternative a negative cost.

The second reason is that they can avoid a lock-in effect. A lock-in effect refers to the difficulties of changing infrastructure with long lifetimes such as buildings or highways once they are constructed. Constructing new equipment and infrastructure tends to be more affordable than retrofitting or replacing old equipment and infrastructure. Therefore it is relatively cheaper to pursue mitigation options in sectors where new energy conserving infrastructure can be built.

A similar point relates to the region with the greatest low cost mitigation opportunities. As suggested in the previous section, Asia's energy use is still low but increasing rapidly. Moreover, much of Asia's energy-related infrastructure will need to be constructed over the next few decades. The time is consequently ripe to introduce measures that can encourage infrastructure investments that would promote sustainable lifestyles and thereby minimise energy and fuel consumption.

The reduction potential from these opportunities is illustrated in Figure 11.5 which shows the amount of GHGs that can be mitigated at low cost in different countries (Hanaoka et al. 2008). The next section will evaluate efforts to take advantage of these opportunities in the building and transport sector in Asia.

Figure 11.5 Low cost mitigation potential

Source: Adapted from Hanoaka et al. 2008

4.1 Mitigation opportunities in buildings

Power use in buildings is arguably the lowest hanging fruit of energy consumption reductions. Not only would GHG emissions be substantially cut, lower costs would be offered to the end-user of many of these appliances. Thus, spurred by high fuel prices and growing concerns over energy security, national governments in Asia have implemented various measures to improve building designs and appliances. These include voluntary programmes, building and appliance standards and labels, educational programmes, best-practice and benchmarking programmes, state market transformation programmes, financing, and public sector procurement.

Mandatory and voluntary standards and labels for appliances have already been instituted in 60 developed and developing countries. Due to the broad range of energy efficient appliances, each type of appliance has its own regulations. In the U.S., which is a leader in energy efficiency standards, more than 40 household appliances are subject to federal mandatory and/or voluntary energy performance standards. China has also implemented minimum performance requirements for air conditioners and refrigerators over the past several years.

At the building performance level, the International Energy Efficiency Code, developed by the International Code Council which is notable for its building codes and standards, has drawn interest in Asia. The Chinese government has already implemented a “regulation on energy conservation in civil buildings” (State Council 2008), which sets a legal framework for building energy performance assessment. In addition, the certification process of green buildings (some property development programmes have been accredited as “green buildings” by the Ministry of Construction and the international Leadership in Energy and Environmental Design (LEED) label) can also serve as a reference for third-party assessment thereby institutionalising the energy efficiency certification process through market mechanisms.

Although most of the potential savings in efficiency are found in the residential and commercial sectors, the government also plays a significant role in accelerating the

commercialisation of end-use products. Public sector procurement is one of the largest sources of end-use consumption and can help to drive economies of scale early in the deployment of new technologies. At the international level, the Agreement on Government Procurement by the World Trade Organization (WTO) serves as a model for purchasing efficient appliances used in public and government buildings. China, Korea, and Japan have already implemented strategies for purchasing energy-efficient goods for government use.

Many efficiency policies today are initiated at the national level. However, the actual management of these technologies will often occur at the urban and local levels and between different ministries. This suggests the need for a close working relationship between national and local governments for effective policy implementation. For example, in China, the Ministry of Construction has already commenced the implementation of urban district heating reform in northern cities with cooperation from the Ministry of Finance. In 2007, a RMB 900 million scheme was approved to subsidise the installation of heat metering and thermal retrofitting in 14 provinces in colder regions. The fund was transferred from the central government to the provinces directly to undertake the housing retrofitting (Ministry of Construction, PRC 2008).

In contrast to the above policies, many regions in China and India, in addition to other developing Asian countries, which are yet to have access to electricity, have different energy requirements. The policies in the context of most developing economies focus on fuel use, namely biomass, which is the primary fuel for cooking. In the longer term, these regions will likely move towards greater electrification. Driven by urbanisation, they could either replicate the lifestyles found in modern Asian cities—or pursue lower carbon lifestyles. Thus, there is an enormous opportunity to not only retrofit current infrastructure, but to introduce measures for minimising energy and fuel consumption in buildings that are yet to be built. The same applies to the infrastructure and planning in the transport sector, the focus of the next subsection.

4.2 Mitigation opportunities in the transport sector

Reducing emissions from the transport sector can be categorised as: (i) reducing unnecessary travel through land use planning, congestion charges and non-motorised transport; (ii) shifting or retaining mode share of mass transport; and (iii) improving energy intensity through fuel switching or fuel efficiency standards. This section focuses on the first two options—reducing travel activity and shifting modes—since they can support the lifestyle and behavioural changes that are central to sustainable consumption.

Unlike developed economies, many Asian cities have the advantage of high-density and mixed-use environments, reducing distance travelled and energy use. Currently, cities in Asia have population densities that average 150 people per hectare, whereas density figures in North American cities are between 15 to 26 persons per hectare. In addition, many cities in Asia have high levels of non-motorised transport (walking and cycling). For example, 65% of travel in Chinese cities occurs from non-motorised modes (Kenworthy 2006).

Additionally, several cities in the region have reduced transport energy with land use planning. The obvious case is Singapore, which beginning with a plan for a compact city in 1971 and through road pricing schemes in the 1990s, has limited growth in energy-intensive personalised transport. More than 50% of households and 40% of places of work are located near the mass transit system and vehicle ownership has remained at a comparatively low 100 cars per 1,000 people in Singapore (Olszewski 2007). In

Shanghai, an innovative license plate auctioning system has brought the number of vehicles to one-sixth the level of auto-friendly Beijing (Gordon and Sperling 2009). Finally, lower income cities such as Surabaya, Indonesia have improved the integration between housing and transport, making both more sustainable and low carbon (Kenworthy 2006).

An interesting trend has been the increase in bus rapid transit (BRT) programmes in Asia. A BRT is a bus system that runs on segregated lane similar to an on-road subway and offers passengers several service amenities such as sheltered boarding stations (Wright and Fulton 2005). As of this writing, there were more than 30 BRT systems in Asia. Most importantly, several of these projects have improved lifestyles and reduced the city's carbon footprint. For example, the first line of Jakarta's BRT has saved travel time and lowered emissions of GHGs (Ernst 2006; Matsumoto 2007; Sutomo, Romero, and Zusman 2008). There are also positive examples of light rail and metro rail in developing Asia's densely populated cities. For example, the Delhi metro has been credited with serving 2.26 million passengers daily and mitigating an estimated 38,000 tonnes of CO₂ annually since its 2006 completion (Sudo 2009).

Encouragingly, several programmes have been launched to scale up improvements in public transport. For example, the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) in India is a government-initiated programme to allocate approximately \$25 billion to urban development projects in 63 cities over a six year period from 2005-2012. Much of the JNNURM money is slated for public transport improvements (Agarwal and Zimmerman 2009).

5. Barriers to mitigation opportunities in the buildings and transport sectors at the end-users level

In formulating a sustainable low carbon consumption strategy, a number of stakeholders are involved beyond the actual energy consumer. These range from the government to investors to property developers to utilities. As such, there is also a greater probability of encountering barriers, including financial, institutional, social and cultural obstacles. Among these barriers, the lack of consumer choice, high consumer costs, and limited consumer awareness pose the greatest challenges. These challenges are discussed below with reference to Asia's buildings and transport sector.

5.1 Buildings

Consumer choice

For buildings that are already built, consumers lack choices in improving energy efficiency of the end-uses. The very nature of urban energy structures often prevents consumers from making those choices. An analysis from the International Institute for Applied Systems Analysis (IIASA) shows that energy from urban systems are determined by, in order of importance, spatial division of labour, urban form, end-use efficiency, integration of existing systems, and fuel substitutions (Grubler 2009). Consumers lack influence over all of these factors except for energy end-use. And while consumers can desire more efficient buildings and appliances, whether they actually do so requires resolving a related set of principal-agent or PA problems.

In Asia's buildings sector, the PA problem is a major barrier to improving energy efficiency (Murtishaw and Sathaye 2006; IEA 2007). While all stakeholders realise that lower GHG

emissions are attained through lower energy use, the problem lies with who pays for and benefits from these improvements. PA arises when investors who put in money to improve efficiency do not necessarily receive the benefits of energy saved. As long as the landlord pays for the improvements and the tenant pays the energy bills, the investment will not be made.

Similarly, an opposite PA problem arises when the energy bills are paid by the landlord, leaving the tenant with no incentive to moderate energy use. In China, the current billing and pricing system and the regulatory framework give no incentive for end users to save energy for heating, which accounts for more than 40% of energy consumption in urban buildings and has the largest potential for energy and carbon emissions savings. Despite a significant reduction in heating intensity as a result of the 1995 National Energy Efficiency Standard for Heating in New Residential Buildings, the average heating consumption in a house complying with the national code in Northern China is still twice as high as in the most efficient houses in the Baltic region including Sweden, Denmark, the Netherlands and Finland. Under the current situation, neither home builders nor property developers have incentives to build higher efficiency housing since that entails extra costs. As heating consumption is billed on the basis of floor space area instead of actual consumption, consumers are not given a price signal to conserve energy and no economic incentive is available for developers to build highly energy-efficient houses.

Consumer costs

High initial costs have always been a major barrier to the investment of energy-efficient infrastructure and buildings (IPCC 2007). Many investors realise that in the long run more money is saved through efficiency. In some cases, for example with energy saving light bulbs, such investments are affordable; however, psychological attachments to existing technologies can prevent the adoption of new technologies. In other cases, these improvements will require substantial financial resources for the investor. Yet, due to lack of access to capital, they are not able to make such investments. Many borrowers from low-income groups and small businesses may not be deemed credit worthy to take out loans for building improvements.

In Asia, the result has frequently been that the potential for small and large energy efficiency projects remains untapped. Many regions do not have adequate financial institutions to offer credit to investors who want to make efficiency improvements. Similarly, while efficiency investments are relatively safe with reliable paybacks, many lenders do not know about the low risks of efficiency related investments. Thus the government can step in to bring down costs for consumers or help to drive industry towards lower costs.

The Chinese government has been actively helping its industries to sell energy saving products. In June 2009, the Ministry of Finance promulgated the “provisional measure of management on promoting energy-saving product by giving subsidies” (Ministry of Finance, PRC 2009). This programme subsidised companies that were manufacturing energy saving products and allowed them to pass the savings on to the consumers. The aims were not only to orientate consumers towards more energy efficient choices, but to also make them aware of these products.

In addition, the government can play a significant role in driving down the costs of new technologies. Public sector procurement can help to drive economies of scale during early stages of deployment.

Public works projects also enable overall efficiency improvements in many communities. For example, in China, the Ministry of Construction has already commenced the implementation of urban district heating reform in northern cities with cooperation from the Ministry of Finance (Ministry of Construction, PRC 2008).

Consumer awareness

The lack of building standards and labelling for appliances is a barrier to the adoption of energy efficiency among the general population. Building developers and appliance manufacturers need to communicate the potential contribution to financial savings and reduced emissions through their products (Martinot and Borg 1998). Thus, the government needs to step in to enforce standards and aid in the communication process. There are many examples where these efforts are greatly aided by government sponsored labelling programmes that verify manufacturer claims. Indeed, many property buyers do not trust the stated energy performance from property developers. Thus, consumer awareness also entails the involvement of government agencies that can establish and maintain standards, aid in verification, and communicate benefits to the general public.

At the end-use level, the question arises: which choices have the greatest impacts and which ones can be avoided? Is reducing consumption the best solution? The answers depend on many variables including values and personal preference but part of the challenge is the lack of relevant information available for consumers.

In order to avoid the unsustainable patterns of consumption that characterise developed economies, life-cycle assessment (LCA) is a powerful tool to help understand the contributions that consumer decisions have on GHG emissions. LCAs have many benefits across the supply chain. Not only does it enable end-use consumers to understand their own carbon footprint and externalities, it will help to establish a pricing system that reflects the environmental costs of products as well as helping producers to differentiate their products and improve the efficiency of their supply chain.

Moreover, the information from LCAs will work hand-in-hand with a carbon market by generating credits for investments in low carbon innovations. The linkage of reliable information and the pricing system helps to establish an economic relationship between the production process, consumption, and climate impacts, ultimately leading to greater resource and carbon efficiency.

5.2 Transport

In the Asia-Pacific region, there are many remaining challenges to match the successes achieved to date. With urbanisation, many Asian cities are experiencing a sharp increase in travel demand. For example, in China and India, travel demand is growing at more than 5% per year. Moreover, while most cities are densely populated, de-concentration and the resulting increases in distances travelled and energy consumption have become increasingly evident in Asia. Smaller cities such as Bandung, Indonesia have seen the emergence of communities and commuters on the city's peri-urban fringe (Perera and Permana 2009). In addition, deliberate attempts to replicate Singapore's success with compact cities have not always been successful. For example, poorly integrated land use plans undermined attempts to limit city growth in Bangkok (IGES 2004).

Moreover, public transport is declining across cities in developing Asia (Table 11.4). There are growing concerns that improvements in public transport service and quality

will not come soon enough to reverse these trends. For example, in India, a dedicated city bus service operates in only 17 of the country's 35 cities with populations over one million (Singh 2005). Other concerns are related to the affordability of public transport for low income segments of the population (Tiwari 2007).

Table 11.4 Public transport mode share in Asia

City	Earlier year	Public transport as a percentage of motorised trips	Later year	Public transport as a percentage of motorised trips
Bangkok	1970	53	1990	39
Kuala Lumpur	1985	34	1997	19
Seoul	1970	67	1992	61
Tokyo	1970	65	1990	48
Shanghai	1986	24	1995	15
Guangzhou	1995	33	2002	20

Source: Adapted from Hook 2002; Wright and Fulton 2005

Moreover, there are more innovative modes that have not performed as well as initially anticipated. For example, though Jakarta's BRT programme's first line has become popular, the project's other lines have had lower occupancy rates and saved less time and energy (Sutomo, Romero and Zusman 2008). In other cases such as Delhi's BRT, operational issues on a 5 km pilot line have led to that portion of the road being called "the corridor of chaos." More generally, some have argued that BRT programme differences in decision making structures are not likely to operate as well as in Asia (Houssain 2006). There have also been concerns about the financing of more ambitious overhauls of public transport systems. In the case of the JNNURM, delays in the delivery of bus orders have dampened enthusiasm for the programme. The bottom line is that for many of the strategies that seek to reduce energy through lifestyle and behavioural changes, there are many barriers. The following discussion draws upon examples from Malaysia, India and Indonesia to illustrate some of these barriers.

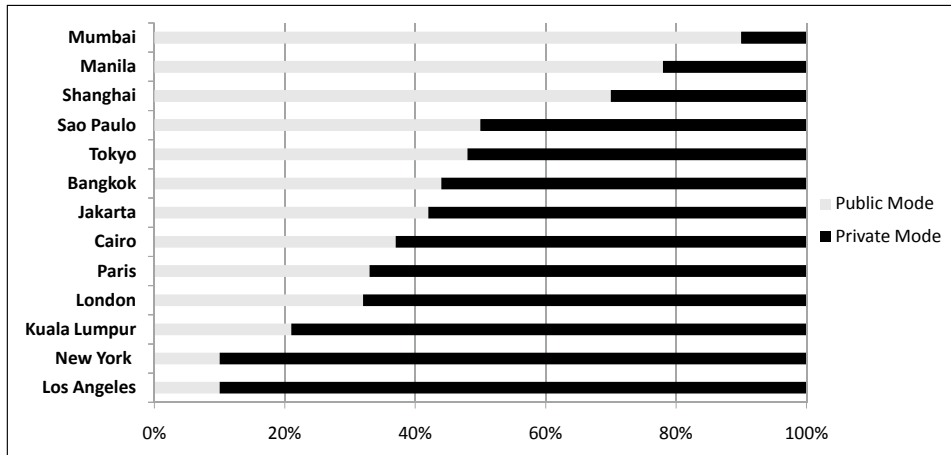
Consumer choice

The lack of consumer choice is a key barrier to sustainable modes of transport. A case in point is Malaysia's fastest growing city, Kuala Lumpur, where vehicle-friendly development plans resulted in constraining transportation choices. As shown in Figure 11.6, Kuala Lumpur has an almost 80% mode share of private transport. With the city's rapid development in the 1980s and 1990s came the emergence of a consumer-oriented middle class and growing demand for suburban lifestyles and housing. This growth contributed to the development of residential districts such as Gombak and Petaling and the transformation of the neighbouring State of Selangor into a population centre, leading to an overall increase in the number of vehicles and motorised trips. To a significant extent, Kuala Lumpur has followed the North American pattern of motorisation "complete with the proliferation of expressways and big-box shopping centres" (Bunnell, Barter and Morshidi 2002).

In the 1980s, the government invested heavily in the construction of more than twenty new roads and road improvement projects covering the greater Klang Valley that surrounds Kuala Lumpur. The construction of roads temporarily reduced congestion in the city centre but induced travel demand outside it. This has made it difficult to reverse trends that saw public transport in Kuala Lumpur fall from an already low 34% of mode share in 1985 to 19% in 1997 (Wright and Fulton 2005).

In addition, government support of the country's car industry added to these difficulties. Kuala Lumpur has recently invested in a light rail transport system that will be integrated with feeder buses and commuter rail. It nonetheless remains to be seen how the system will affect commuting patterns after vehicle-dependent lifestyles have become well established.

Figure 11.6 Public transport mode share



Source: UITP 2001

The case of Kuala Lumpur illustrates the need for long term planning that prevents a lock-in into energy intensive transportation patterns. Thus, early action is recommended for parts of Asia that are urbanising. Nevertheless, initial costs for sustainable transport modalities can be prohibitively expensive.

Consumer costs

Cost barriers have proven particularly challenging in countries with rapidly urbanising poor populations. High costs, for example, have been the chief obstacle for many of the 10 million inhabitants of Delhi, India. Although a master plan was developed to encourage mixed land use planning in 1990, the city has witnessed a sharp increase in urban migrants who have settled outside the planned zoning over the past two decades. The result has not only increased travel for work and other essential needs, but it has also created demand for affordable public transport. While high profile projects such as the Delhi Metro have absorbed some of this demand (Sudo 2009), they have also been too expensive for many consumers to use on a regular basis (Tiwari 2007).

The high fares of the Delhi Metro are symptomatic of a deeper problem. Designing a sustainable financing model for public transport often requires affordable fares while keeping the system financially viable. When fares are too low, service providers find it difficult to cover operational costs and “afford even routine maintenance and vehicle replacement, let alone system modernization and expansion” (Pucher 2004). Delhi has dealt with this problem better than many other cities in India. Delhi developed a public-private partnership that contracted service provision for public transport to private operators in the early-1990s and, after some initial growing pains, found competition between private providers to be an effective way of coping with rising demands for quality transport (Kharola 2008). India's JNNURM also holds promise to support Delhi and other

Indian cities in their efforts to improve the performance of their bus systems (Agarwal and Zimmerman 2009).

The next big challenge will be to keep the quantity and quality of service high so that consumers will continue to rely on public transport as their incomes grow. Motorised vehicles in many major Indian cities have increased between 30% and 40% in just five years from 1995 to 2000 (Singh 2005). This reflects the draw of increasingly affordable motorcycles, and the small Nano car, as well as underpriced fossil fuels. Making consumers aware of the full costs of personalised transport is another challenge to low carbon transport in Asia.

Consumer awareness

Nowhere is the challenge of sensitising populations to transportation costs greater than Indonesia where awareness of energy savings is low because subsidies keep fuel prices low. Subsidies are intended to allow poor populations access to energy, but they often miss their intended target and become politically difficult to remove once in place (UNEP 2008). Since becoming an oil importer in 2004, the Government of Indonesia has used up to 3.2% of its annual budget to subsidise fossil fuels. This not only made Indonesia's fuel the cheapest in Asia, but also contributed to an increase from 10 million to more than 50 million vehicles between 1990 and 2007 (Suhadi 2009). Fortunately, awareness of these costs has also increased recently. In October 2008, the Government of Indonesia cut subsidies on premium gasoline and diesel by approximately 30%. When cutting the subsidies, the government also used a public education campaign to explain their full costs to the public. In addition to easing inflation, the cost increase from the subsidy reductions caused some to drive less. It is nonetheless important to point out that governments should ensure that the money saved from subsidies is reallocated to other social welfare needs.

There have also been other ways to sensitise consumers to the value of low carbon transport in Indonesia. Jakarta's car-free day is a good example. The city's car-free day began as an annual event supported by nongovernmental organisations (NGO) in 2002. It has since grown into a government-supported initiative that is held every Sunday in one of Jakarta five administrative municipalities. Car-free days attract crowds of up to 5,000 and help educate the public about the virtues of non-motorised transport. Public transport is also promoted since Jakarta's bus rapid transit (BRT) programme is the only mode allowed to run on the closed-off segment of the road. Following upon the success of Jakarta's programme, other Indonesian cities such as Surabaya, Bogor, and Yogyakarta have begun to hold their own car-free days. The programme's popularity suggests that raising awareness about energy savings also requires demonstrating some of the intangible benefits of non-motorised and public transport to consumers (Dillon and Damantoro 2008).

6. The way forward

The link between consumerism and climate change is clear. A fast rising proportion of the GHGs released into the atmosphere each year can be traced to buildings and transport services consumed by individuals, households, and the government sector. With a consumer driven global economy dependent on fossil fuels for energy, each decision affects the amount of GHGs released. While the notion of sustainable consumption has been around for many years, it has been beset by various social, financial and institutional barriers, however, the explosion in interest among the political and business sectors to address the climate problem has added impetus to retool the economy for

sustainable consumption. With energy, and consequently the GHGs that underlie climate change linked to consumption behaviour, policies and measures are needed to make this transition. This chapter has identified key barriers and solutions for rapidly urbanising Asia to move away from the carbon intensive patterns of growth seen in industrialised countries and onto a path of sustainable consumption in the buildings and transportation sectors. The actions undertaken by individuals have direct impacts on sustainable consumption but equally important are those made by industries that make products and the government as a consumer. In the context of measures including incentives, LCA, and the international policymaking process, this chapter identifies the way forward for each stakeholder in order to move towards sustainable consumption. Moreover, the international framework is a critical player in mobilising financing and resources to economies that cannot achieve these changes on their own.

6.1 Consumers

The lack of consumer awareness is a major barrier to making sustainable consumption choices. Policies to educate the public on the benefits and impacts of their choices are effective tools. For example, eco-labelling programmes have proven effective in many developed countries and have helped to drive consumer confidence in energy efficient products and driven their sales. These labels help consumers make choices in line with their values and preferences and help to increase awareness for such products. At the same time, LCA offers a powerful way to help compare the consequences of choices by systematically estimating the performance of a product or service. These tools not only inform the consumers of the initial cost of purchase but also their impacts on energy and fuel use, as well as social impacts over its lifetime.

Another major barrier is the high capital costs associated with making the right choices for sustainable consumption. Even if individuals know of the long term benefits to themselves and society, they may not have the financial capacity to acquire their preferred options. Government programmes for rebates, for example, can help consumers make a more sustainable choice, for example, by choosing energy efficient appliances and electric vehicles that require less fuel. Another tool is a price on carbon. Although consumers are not directly affected, the final price reflects the embedded carbon associated with the manufacturing of a product. This helps to create more sustainable, yet more expensive products to compete on a level playing field with conventional technologies, which are often underpriced, as their prices do not reflect externalities associated with their GHG emissions.

6.2 Producers

In order to help manufacturers mass produce sustainable products, a set of incentives can be made available to encourage the production of more sustainably performing products. The government can provide support in the form of subsidies for manufacturers who can then pass on the savings to the consumers. In addition, other programmes can help retool factories to incorporate sustainable consumption technologies into the final product. At the same time, penalties can sway producers away from older, unsustainable technologies in the building and transport sector.

The growing movement of corporate social responsibility (CSR) is also a driver for consumers to improve both the environmental and social impacts of their consumption. Eco-labelling policy initiated on the production side has forced manufacturers to innovate their process for greater efficiency and is a tool to build up an environmental image among consumers.

6.3 Government

In contrast to choices that are available to consumers, infrastructure and urban planning are typically the responsibility of the public sector. The lack of good governance has led to a lock-in into carbon intensive practices and patterns of unsustainable consumption in the buildings and transportation sectors. At its disposal, government agencies can engage in urban planning and green purchasing. In evaluating policy options, governments can employ a co-benefits approach, an approach that finds synergy in addressing local problems that have global consequences.

Studies have shown that urban planning and public works by the government play a bigger role in managing the overall efficiency of urban systems. For many regions that are developing, there is a great opportunity for local authorities to design urban regions in such a way that optimises the spatial location of different sectors of the economy and the co-location of resources for industry. Public infrastructure provision, such as the management of public transportation resources and utilities is often the only way to fund and run projects that cannot be carried out by the private sector alone. These include light rail systems, BRT, and district heating and cooling.

As a major buyer of products and services, the public sector can drive economies of scale through “green purchasing.” By making initial purchases of new products, this not only helps to drive economies of scale, it also gives confidence to individual consumers. Thus, governments should initiate and set examples through the adoption of green procurement policy, green buildings, and diversifying energy options.

Most of the important actions happen at the local and national levels. However, the international and regional regimes can play a role in accelerating sustainable consumption in the buildings and transportation sectors. By the same token, national governments and domestic stakeholders can help shape the direction of multilateral and bilateral processes or conventions that impact on climate change and sustainable consumption. At the international level, negotiations on the post-2012 climate regime, particularly related to carbon pricing, technology transfer and financial mechanisms, could encourage national governments to institute policies and measures incentivising sustainable consumption in the buildings and transport sectors. In this context, governments at the local and national levels have a crucial role in reorienting consumption choices towards low carbon and sustainable patterns of resource use.

Notes

1. We are grateful for the useful discussions with Atsushi Watabe and Takashi Otsuka on the early versions of the draft, and to Jane Romero for data in the transport section.
2. In recent years, some developed countries have begun integrating elements of sustainable consumption in policies intended to achieve Annex-1 Kyoto Protocol reduction targets.

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Chapter 12

United We Stand: Regional cooperation
from a wider perspective of sustainable
consumption and production

Chapter 12

United We Stand: Regional cooperation from a wider perspective of sustainable consumption and production

Satoshi Kojima, Xin Zhou, and Anindya Bhattacharya

1. Introduction

The importance of international and regional cooperation in promoting sustainable consumption and production (SCP) has been recognised in international policy processes. Article 15 of the Johannesburg Plan of Implementation of the World Summit on Sustainable Development in 2002 calls for international cooperation in line with the principle of common but differentiated responsibilities, and in response to this article, the Marrakech Process was launched in 2003 as an international process, led by the United Nations Environmental Programme (UNEP) and UN Department of Economic and Social Affairs (UN-DESA), for elaborating a draft 10-year framework of programmes on SCP (see Box 12.1).

In the Asia-Pacific region, the Asia Pacific Roundtable for Sustainable Consumption and Production (APRSCP) exemplifies the efforts to foster regional cooperation. Since its establishment in 1997, APRSCP has provided an arena for information sharing and development of partnerships between industry, governments, academia and non-governmental organisations (NGO) in the region to promote SCP. In general terms, it is quite obvious that regional cooperation, such as technical and financial cooperation, is useful to promote SCP.

Chapter Highlights

This chapter aims to demonstrate the potential roles of regional cooperation in promoting SCP in the Asia-Pacific region, from a wider perspective including provision of consumption opportunities for everybody, in particular the poor. Three case studies based on IGES quantitative research are presented to test the key hypothesis of the chapter that SCP requires collective action and coordinated efforts through regional/international cooperation to address potential negative spillover effects and/or to facilitate effective implementation of domestic efforts. The major findings are as follows:

- Seeking win-win solutions through regional and international cooperation is essential to promote SCP in the wider perspective.
- Under economic globalisation and the influence of transboundary environmental pollution, promoting SCP domestically may be neither efficient nor effective when international externalities prevail.
- Production and consumption go hand-in-hand when discussing the issue of SCP and should be regarded systematically as part of the whole.
- Selection of the most appropriate level (e.g., international or national level) is important to address specific SCP issues for effective implementation of cooperation.

Both developed and developing countries should be more open to cooperation and make pragmatic efforts to search for better solutions to address SCP issues.

Box 12.1 Johannesburg Plan of Implementation, Chapter III, Article 15

Encourage and promote the development of a 10-year framework of programmes in support of regional and national initiatives to accelerate the shift towards sustainable consumption and production to promote social and economic development within the carrying capacity of ecosystems by addressing and, where appropriate, delinking economic growth and environmental degradation through improving efficiency and sustainability in the use of resources and production processes and reducing resource degradation, pollution and waste. All countries should take action, with developed countries taking the lead, taking into account the development needs and capabilities of developing countries, through mobilization, from all sources, of financial and technical assistance and capacity-building for developing countries. (...)

In addition to these instrumental functions of regional cooperation, a regional/international perspective has fundamental importance for the proper implementation of SCP. With economic globalisation, production and consumption are linked globally through value chains. Consumption in one place can induce environmental impacts in other places and production in one place can influence local residents, neighbouring countries and the global environment. Achieving the objectives of SCP in an individual country may exert unnecessary pressure on other countries in the globalised economy. Furthermore, it must be emphasised that the true objective of SCP is to promote sustainable development by changing the current patterns of consumption and production. Sustainable development must be understood as ensuring that everybody can meet their basic needs without compromising the basis of human survival or at the expense of future generations (see Box 12.2).

Box 12.2 Is sustainable consumption really relevant for developing countries?

Sustainable consumption is frequently misunderstood as a tool primarily aimed at reducing over-consumption in developed countries. The true aim of sustainable consumption is to develop consumption opportunities that would allow everybody to meet their needs, but without generating the associated negative environmental, social and financial impacts, typically seen in developed countries.

Source: UNEP 2005

Along this line, the success or lack thereof of one country's SCP measures should be judged not only on how economic and social development is decoupled from material throughput in that country, but also on how they contribute to sustainable development in other countries. Considering the current rapacious exploitation of global resources by rich countries (as well as the rich in poor countries) mentioned in chapter 1, it would seem that meeting everyone's basic needs is not consistent with the current level of material affluence of rich segments of the world and the gross inequalities along global value chains. As Mahatma Gandhi said "Earth provides enough to satisfy every man's need, but not every man's greed."

Kuhndt et al. (2008) pointed out that industrialised countries expropriated 80% of world total value added at the cost of 20% of world total ecological rucksack.¹ It has been argued that it is possible to distinguish between "needs," which are finite and common across cultures and generations, and "satisfiers of needs," which are potentially infinite and diverse across cultures and generations, and that some satisfiers offer only "pseudo-

satisfaction” or even violate needs satisfaction (Max-Neef 1991; Jackson and Marks 1999; Jackson 2002). Understanding SCP in this context makes the regional/international perspective involving both developed and developing countries very important, as the key issue is how to connect a reduction and revision in the material consumption of the rich through redesigning the process of needs-satisfaction of the rich, on the one hand, to the needs-satisfaction of the poor by enhancing sustainable consumption opportunities, on the other.

There has been a lack of policy research on SCP issues from a regional perspective. SCP is a cross sectoral issue in nature and quantitative analysis of SCP from a regional perspective usually requires a multi-sectoral and multi-regional analysis which is a challenging task. Nevertheless, filling this research gap is a highly policy relevant and urgently needed task to promote SCP. Without policy research based on quantitative analysis, it may be difficult to identify key priority areas of regional cooperation and to formulate effective policies and strategies to promote SCP, in particular the proposed 10-year framework of programmes on SCP which will be discussed in the 2010-2011 cycle of the UN Commission on Sustainable Development.

The ongoing globalisation of consumption and production further endorses the importance of such research. The volumes of material and energy flows associated with international trades of products and services have significantly increased. This globalised system has yielded rapid economic growth which may have contributed to poverty reduction in several developing countries like China and India, but it has also caused various social and environmental problems as a result of spillover effects and externalities. For example, there is an ongoing debate, particularly in international climate negotiations, over CO₂ emissions embodied in traded commodities. As it is common that the most CO₂ emissions over a product life cycle are associated with the production process, consumption of imported commodities has negative environmental externalities in the country of production. The issue of international spillover effects of domestic climate mitigation through the globalised production system has also drawn wide attention. Without taking into account these contentious issues, the promotion of SCP from the wider perspective is at risk.

Against this background, this chapter presents three case studies that shed light on the potential roles of regional cooperation in promoting SCP in the Asia-Pacific region based on IGES’ research work. Each case study has a sufficiently different focus on the issue so as to collectively provide a more complete picture on the role of regional cooperation. The first case study focuses on regional implications of Japanese SCP policies to achieve a low carbon society. This study demonstrates that national SCP policies to address the objectives of an individual country may have negative spillover effects on other countries, while achieving a low carbon society through regional cooperation may provide better well-being for all affected communities in the context of regional sustainable development.

The second case study addresses the issue of emissions embodied in international trade. It presents how embodied emissions act as an indicator for communication through the global value chain to improve the environmental performance of the product supply chain and how regional and international cooperation is important to achieve this end. The third case study highlights the potential of cross-border energy infrastructure development to promote sustainable energy consumption. It demonstrates that regional cooperation can help achieve social, economic and environmental objectives efficiently. Based on these studies, conclusions and policy recommendations are provided to promote SCP in the Asia-Pacific region.

2. Regional cooperation for low carbon society in East Asia

2.1 Low carbon society as a key ingredient of SCP

The concept of a Japanese Low Carbon Society (LCS), which has been reflected in Japanese climate policy including vision statements by Japanese prime ministers (particularly in the Fukuda Vision released in June 2008, as well as the recent statement by Prime Minister Yukio Hatoyama in September 2009), aims at a massive reduction in CO₂ emissions, while satisfying necessary service demands (“2050 Japan Low-Carbon Society” Scenario Team 2007). It requires a drastic reduction of aggregate material throughput, particularly fossil fuels throughput, without compromising the quality of life. While the current prosperity of developed economies is underpinned by mass consumption of fossil fuels, it is now recognised that such an unprecedented scale of fossil fuel use is unsustainable. Fossil fuels are non-renewable resources and they will be depleted at a certain point of time. Moreover, there is accumulating evidence of anthropogenic global warming due to greenhouse gas emissions, and fossil fuel combustion is a major emission source (IPCC 2007). In addition to these physical risks, there are also political risks with the heavy reliance on fossil fuel use, as many fossil fuel abundant regions are, in many cases as a consequence of this abundance, politically sensitive (Lefevre 2007). LCS is thus regarded as a very important ingredient of SCP in Japan and other countries due to the need to move away from a reliance on fossil fuels.²

The scenarios to achieve Japan LCS by 2050 (the Japan LCS scenarios) were proposed by a research project funded by the Ministry of the Environment Japan (LCS2050 Project). The Japan LCS scenarios demonstrate the technological potential to reduce Japanese CO₂ emissions by 60-80% from 1990 levels by 2050 (“2050 Japan Low-Carbon Society” Scenario Team 2007). The Japan LCS scenarios are backed by a dozen actions towards LCS that will overcome the currently existing constraints in realising the Japan LCS scenarios. Each of these actions consists of various low carbon measures. For example, the first action “comfortable and green built environment” consists of several measures such as a certificate system and financial schemes to promote low carbon buildings and promote solar and wind utilisation in the design of residences and buildings, which can achieve reductions in the demand for energy per household and per unit area of nonresidential building floor space by 40% from 2000 levels (“2050 Japan Low-Carbon Society” Scenario Team 2008).

This section demonstrates the potential contribution of regional cooperation to SCP based on an IGES study on regional implications of the Japan LCS scenarios. In this study, the baseline Japan LCS scenario without carbon pricing is formulated as a set of the following assumptions:

- Households’ electricity demand reduces by 40%, which requires a 20% increase in households’ demand of electronics and other manufacturing goods.³
- Productivity of energy input for agricultural, manufacturing and service sectors except for the electricity sector increases by 40%, which is achieved by diversion of capital and labour inputs represented by a 20% reduction in productivity of value added inputs.
- Productivity of output augmenting technology for the electricity sector increases by 40%, which is achieved by diversion of capital and labour inputs represented by a 40% reduction in productivity of value added inputs.

Then, two types of carbon pricing to achieve a pre-specified reduction target of Japanese CO₂ emissions (by 25% from the 1990 level) are introduced to the base LCS scenario:

(i) a Japanese domestic carbon tax (LCS-1 scenario) and (ii) a regional cap and trade among ASEAN+3 countries (LCS-2 scenario).⁴ The LCS-1 scenario represents the Japanese domestic SCP policy in the narrower sense, in which SCP is only utilised to reduce material throughputs without deteriorating the quality of life in one country, while the LCS-2 scenario represents a regional SCP policy in the wider sense, in which SCP is intended to promote sustainable development in the international context. In order to demonstrate the potential contribution of regional cooperation towards regional SCP in terms of regional CO₂ emission reduction without severe negative economic and social impacts, the allocation of emission quotas under the LCS-2 scenario is assumed to reflect the development level of each member country. In addition, the LCS-2 scenario assumes that financial assistance will flow from Japan to other members (see Box 12.3).

Box 12.3 Emission quota allocation and financial assistance under the LCS-2 scenario

Assumptions for initial emission quota allocation:

- Japan: -25% from 1990 levels (the same target as the domestic carbon tax)
- Republic of Korea: -5% from 2001 levels
- Less developed ASEAN members (Viet Nam, Cambodia, other): +20% from the 2020 business-as-usual (BAU⁵) emissions.
- Remaining ASEAN members: -10% from the 2020 BAU emissions.

Assumptions for financial assistance from Japan:

- To Republic of Korea and Singapore: No assistance
- To China: \$1 billion
- To Thailand and Malaysia: \$0.3 billion
- To the remaining ASEAN+3 members: \$0.6 billion

Source: Authors

2.2 Policy impacts assessment: potential benefits of regional cooperation

The economic and environmental impacts of the LCS scenarios in 2020 were quantitatively assessed by policy simulations using the Regional Environmental Policy Assessment (REPA) model (see Box 12.4).

First the results of the impact assessment of Japan LCS without regional cooperation (LCS-1) are reported. Then the study then examines how regional cooperation reflected in the LCS-2 scenario changes the results.

Box 12.4 REPA model

The REPA model is a multi-regional computable general equilibrium (CGE) model developed to conduct integrated policy impact assessments encompassing environmental, economic and poverty impacts in East Asia (Kojima 2008). The current version of the REPA model employs a 12-region, 33-sector aggregation of the Global Trade Analysis Project (GTAP) database Version 6 (Hertel 1997). The REPA model introduces an environmental module and a policy cost module into the GTAP-E model, a version of the original GTAP model that introduces energy substitution and CO₂ emissions (see Burniaux and Truong 2002).

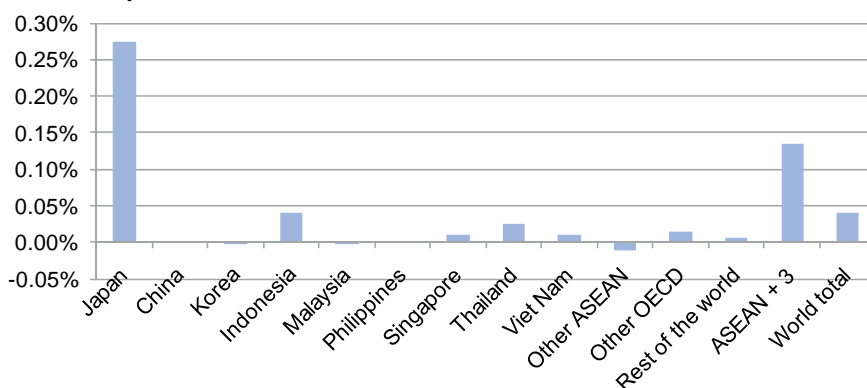
The REPA model employs a recursive dynamic approach to conduct policy impact assessments up to 2020, in which the base datasets corresponding to 2001 are updated by exerting exogenous macroeconomic shocks. In the general equilibrium world where interactions among all sectors in the economy are taken into account, the real costs incurred by implementing environmental policies such as low carbon policies must be measured by loss in social welfare for the same amount of inputs or, the other way around, additional inputs to achieve the same level of social welfare.

The REPA model defines the environmental policy costs for industries as the productivity loss due to diversion of some capital and labour inputs from the production process to abatement activities. This approach can capture the working of environmental policies, but it is necessary to improve parameter estimation related to policy costs based on reliable quantitative data to fully exploit the potential of this approach.

Source: Authors

Figure 12.1 shows the impacts of the LCS-1 scenario on the real gross domestic product (GDP) of each region. Throughout this section the impacts of the LCS scenarios are presented as changes from the business as usual (BAU) results in 2020. It is interesting that the LCS-1 scenario increases Japanese real GDP despite the high rate of carbon tax (\$64 per ton of CO₂).⁶ The overall direction of economic impacts depends on the balance between productivity gain from energy efficiency improvements and efficiency loss due to both productivity loss caused by abatement activities and price distortion caused by carbon tax. It must be noted that the result could be opposite if the productivity loss caused by abatement activities were more severe than assumed here, which highlights the importance of elaborate cost parameter estimations based on empirical data.

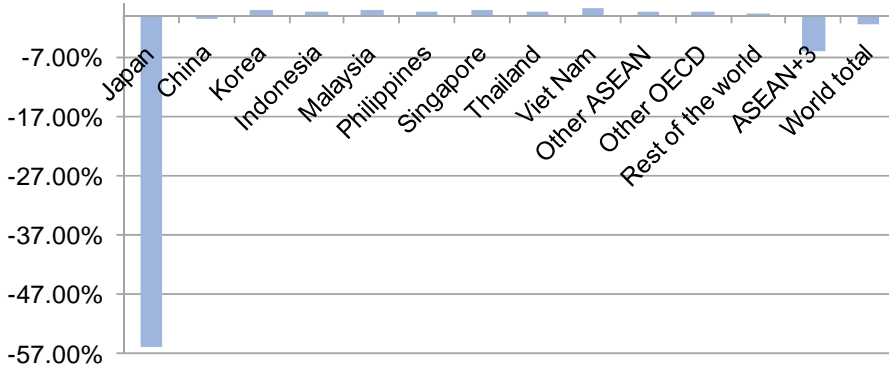
Figure 12.1 Impacts of the LCS-1 scenario on real GDP



Source: REPA simulation results

The results indicate that Japanese measures to achieve LCS without regional cooperation may have negative effects on some countries' economic development. Moreover, there is a fear of spillover effects in terms of increased CO₂ emissions outside Japan, as illustrated in Figure 12.2 in which the CO₂ emissions of each region, except for China, will increase.

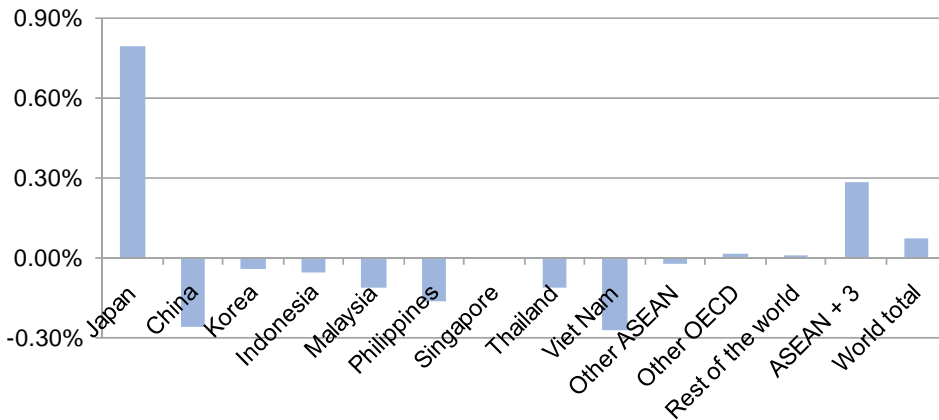
Figure 12.2 Impacts of the LCS-1 scenario on CO₂ emissions



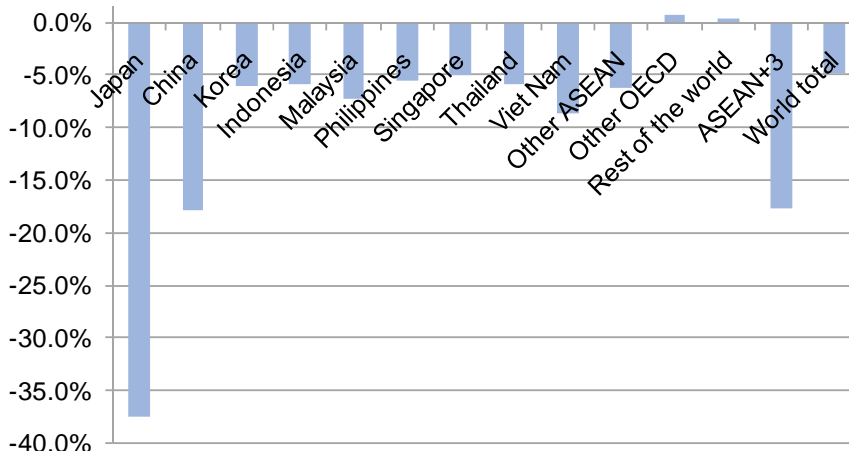
Source: REPA simulation results

These results indicate that the LCS-1 scenario contributes to Japanese economic development with a drastic reduction of national CO₂ emissions,⁷ but it may have adverse environmental and economic effects on some other countries. In this sense, Japanese domestic measures towards LCS without regional cooperation may not promote SCP in the true meaning. The impact assessment of the LCS-2 scenario tells a different story. Figures 12.3 and 12.4 collectively demonstrate that regional cooperation in terms of the regional cap and trade and the financial assistance from Japan to other members of the cap and trade scheme will achieve a significant carbon emissions reduction of the overall ASEAN+3 (by 17.6% from the BAU emissions in 2020) with relatively insignificant real GDP losses.

Figure 12.3 Impacts of the LCS-2 scenario on real GDP



Source: REPA simulation results

Figure 12.4 Impacts of the LCS-2 scenario on CO₂ emissions

Source: REPA simulation results

Except for Japan, which enjoys a much lower carbon price (\$4.4 per ton of CO₂ instead of \$64.0 per ton of CO₂ under LCS-1), introduction of a carbon price to all other ASEAN+3 countries will suppress their real GDP regardless of financial assistance. Still, it seems possible to find win-win solutions for all member countries by increasing the amount of financial assistance from Japan.⁸ Indeed, the regional real GDP of ASEAN+3 will increase by around 0.3%. Moreover, it must be noted that this model does not take into account regional cooperation in other forms, in particular technical assistance to improve energy efficiency in developing countries, which is expected to have significant positive economic impacts.

2.3 Policy implications

The main message from this study is that pursuing SCP in a narrower sense, in which the problem is addressed through the drastic reduction of aggregate material throughput without compromising the quality of life in one country, may adversely affect other countries. Regional cooperation could play an important role to overcome this problem and to achieve SCP in a wider sense, that is, promotion of sustainable development worldwide by changing the patterns of consumption and production. Based on quantitative policy impact assessments using a CGE model, the study provides supportive evidence of this message.

The analysis also illustrates the potential worldwide benefits of regional cooperation. Table 12.1 shows the impacts of the LCS scenarios on real GDP and CO₂ emissions in terms of changes from the BAU scenario.

Table 12.1 Impacts of LCS scenarios in terms of changes from BAU scenario

	Real GDP		CO ₂ emissions	
	(million \$)	%	(million tonnes)	%
LCS1-scenario	19,660	0.04	-742	-1.41
LCS2-scenario	36,612	0.07	-2,525	-4.81
Difference	16,952		-1,783	

Source: REPA simulation results

According to these results, regional cooperation under the LCS-2 scenario increases global real GDP by around \$17 billion while it reduces CO₂ emissions by 1,783 million tonnes, compared with the LCS-1 scenario in which only Japan pursues low carbon society through domestic measures.

In the Asia-Pacific region there are several platforms for regional cooperation such as the East Asia Summit (EAS), the Association of Southeast Asian Nations (ASEAN), the South Asian Association for Regional Cooperation (SAARC) and the Greater Mekong Subregion (GMS), among others. To implement regional cooperation for achieving SCP in a wider sense, it would be effective to connect the political initiatives of developed countries (e.g., Prime Minister Hatoyama's initiative that commits public financial assistance and technology transfer to developing countries) to these regional cooperation platforms, thus demonstrating the mutual benefits of such cooperation.

3. Embodied emissions as an effective indicator to communicate the importance of the global value chain

To achieve SCP it is necessary to take into account all of the impacts (environmental, economic and social) that a product or service has throughout its life cycle, "from cradle to grave." Products may have totally different environmental impacts during different stages of their life cycle from extraction of raw materials, product manufacturing, packaging and distribution, product consumption, recycling, and waste management, until end of life. An environmental improvement made by a manufacturer within its factory border cannot sufficiently ensure that the products will have a good environmental performance throughout its life cycle.

The designers of the products, the upstream suppliers, the retailers, the downstream consumers and waste managers all play a role in influencing the total impacts induced by a product. It is therefore important to communicate among all stakeholders in a product supply chain to achieve effective improvement through life-cycle management.

With international trade and economic globalisation, the value chain⁹ of a product becomes increasingly complex and involves worldwide geographic locations. Decoupling of economic growth from resource use and greenhouse gas (GHG) emissions that have been achieved in the developed world could shift pollution to the developing world, particular in Asia, through outsourcing and offshore activities of companies (Kuhndt et al. 2008). To achieve global governance of resource use and climate change, dematerialisation and decarbonisation throughout the global value chain are important and require cross-border cooperation among key stakeholders in the chain.

In this section, "embodied emissions" (see Box 12.5) are demonstrated to work as an effective indicator to communicate the outcomes of the global value chain. Identifying the methods of applying this approach to address environmental "hot spots" effectively through bilateral, regional and international cooperation is recommended.

Box 12.5 Embodied emissions

Embodied emissions refer to CO₂ emitted from each upstream stage (production) of the supply chains of a product, which is used by the downstream stage (consumption). Closely related to life-cycle thinking and the global value chain, it helps present the total emissions released into the atmosphere and the geographic locations where the emissions are being released and indicates the resulting environmental “hot spots,” the most carbon-intensive stages and locations of the global value chain.

Source: Authors

3.1 Accounting for emissions embodied in international trade

Many academic works calculate embodied emissions to address consumption in developed countries. For Japan, the territorial CO₂ emissions are estimated to have been 1,115 megatonnes of CO₂ (Mt-CO₂) in 1990,¹⁰ while carbon embodiments in the imports to Japan are 249 Mt-CO₂, surpassing emissions embodied in Japan's exports (170 Mt-CO₂) (Kondo and Moriguchi 1998). For Denmark, the CO₂ trade balance changed from a surplus of 0.5 Mt in 1987 to a deficit of 7.0 Mt in 1994 (Munksgaard and Pedersen 2001). Norwegian household consumption-induced CO₂ emitted in foreign countries represented 61% of its total indirect CO₂ emissions in 2000 (Peters and Hertwich 2006). For the U.S., the overall CO₂ embodied in U.S. imports grew from a range of 500 to 800 Mt-CO₂ in 1997 to a range of 800 to 1,800 Mt-CO₂ in 2004, representing 9 to 14% and 13 to 30% of U.S. national emissions in 1997 and 2004, respectively (Webber and Matthews 2007).

At the multi-region level, about 13% of the total carbon emissions of six Organisation for Economic Co-operation and Development (OECD) countries (Canada, France, Germany, Japan, UK and U.S.) were embodied in their manufactured imports in the mid-1980s (Wyckoff and Roop 1994). More recent research (Peters and Hertwich 2008) shows that around 5,000 Mt of 42,000 Mt CO₂ equivalent of global GHG emissions in 2000 were embodied in the international trade of goods and services, most of which are imported by developed countries from developing countries.

These studies indicate a significant amount of carbon embodied in international trade and show that developed countries are “exporting” carbon emissions, mostly to developing countries. An important message derived is that because of carbon leakage, the achievement of mitigation targets by developed nations alone cannot be completely effective in constraining global emissions. Effective total emission control over the global value chain of a product can help address the carbon leakage issue.

IGES conducted a study on CO₂ emissions embodied in international trade in the Asia-Pacific (Zhou 2009). The study applied the Multi-region Input-Output (MRIO) model¹¹ to account for embodied emissions for ten selected economies, including three OECD countries (Japan, Republic of Korea and U.S.), five ASEAN countries (Indonesia, Malaysia, Philippines, Singapore and Thailand), China's mainland and Taiwan. An input-output model is widely used to present inter-sectoral relations and analyse economy-wise influences driven by consumption. It has been extensively used for environmental analysis since the 1980s, in particular in the areas of accounting for energy consumption, and carbon emissions and ecological footprints embodied in household consumption.

A MRIO model provides detailed accounts for imports (with the identification of the source industry and the country of origin) and exports (with the identification of the

destination industry and its geographical location). It is therefore useful to analyse the impacts related to international trade. Using the Asian Input-Output Table 2000 (AIO 2000) (IDE-JETRO 2006) for 24 sectors in the ten economies, the study calculated the total emissions embodied in each final product and traced the contribution of each stage of the global value chain of a product to the total emissions induced by the product.

AIO 2000 includes 24 aggregated sectors for each country. Each sector produces one composite final product and requires intermediate inputs from other sectors. Sectors (including transportation and the service sector) in different countries interact with one another and form the global supply chain of products. It should be noted that different degrees of sector aggregation in an input-output model can influence the calculation results (Lenzen et al. 2004).

Table 12.2 presents CO₂ emissions embodied in the final consumption of each country. By row, for example, Indonesia “imported” 0.8 Mt-CO₂ from Malaysia, 0.2 Mt-CO₂ from the Philippines, and so on. By column, for example, Indonesia “exported” 0.3 Mt-CO₂ to Malaysia, 0.1 Mt-CO₂ to Singapore, and so on. For trade balance in terms of embodied emissions, for example, Indonesia has a net import of 0.5 Mt-CO₂ (calculated by 0.8-0.3) from Malaysia. The trade balance of embodied emissions shown in the last row is calculated by the row sum minus the column sum for each country. Positive values indicate “net imports” of emissions and negative values indicate the “net exports.” China is the biggest net importer of embodied emissions (with a net import of 452 Mt-CO₂), while the U.S. is the biggest net exporter of emissions (with a net export of 464 Mt-CO₂), followed by Japan.

Table 12.2 CO₂ emissions embodied in international trade in 2000*

Region	IDN	MYS	PHL	SGP	THA	CHN	TWN	KOR	JPN	USA	ROW
IDN	133.2	0.8	0.2	0.6	0.4	0.2	0.6	0.4	2.6	6.4	32.4
MYS	0.3	47.2	0.3	1.8	0.6	0.5	0.9	0.4	3.5	6.7	27.8
PHL	0.0	0.1	36.5	0.0	0.1	0.1	0.1	0.1	1.5	4.1	9.3
SGP	0.1	0.8	0.3	35.7	0.3	0.3	0.4	0.3	1.1	2.9	25.6
THA	0.3	0.5	0.2	0.5	91.8	0.3	0.4	0.2	3.1	5.3	31.3
CHN	1.3	2.0	0.4	1.9	2.0	2,252.2	3.6	4.8	51.6	103.6	369.1
TWN	0.3	0.5	0.3	0.2	0.4	2.1	94.4	0.4	3.1	8.3	50.2
ROK	0.3	0.3	0.3	0.3	0.2	1.4	1.0	267.5	4.0	9.8	77.1
JPN	0.5	1.0	0.4	0.8	0.9	1.7	2.6	1.6	861.9	15.4	55.2
U.S.	0.4	1.0	0.5	0.9	0.8	2.3	4.1	2.6	11.3	4,318.5	333.8
ROW	25.0	19.0	11.0	38.0	25.0	79.0	46.0	76.0	189.0	659.0	
Trade balance of embodied emissions	16.0	17.0	1.0	-13.0	11.0	452.0	6.0	8.0	-191.0	-464.0	

Note: IDN: Indonesia; MYS: Malaysia; PHL: the Philippines; SGP: Singapore; THA: Thailand; CHN: China's mainland; TWN: Taiwan; KOR: Republic of Korea; JPN: Japan; U.S.: United States of America; ROW: the rest of the world.

* Emissions are measured in million tonne of CO₂.

Source: Zhou (2009)

Table 12.3 presents the carbon intensity (in terms of CO₂ per unit of product value) of selected carbon-intensive products made from different countries. For example, the

number in row 2 column 2 shows that the carbon intensity of fishery products produced from Indonesia is 1.3 kg-CO₂/\$. For each product category, the top three carbon-intensive products identified by their countries of origin are highlighted in shaded colour.

For example, the crude petroleum and natural gas produced from Singapore, the Philippines and China, respectively, are more carbon-intensive than similar products produced from other countries, in particular those produced from Malaysia and Japan. On the one hand, most of the products made from China or from Indonesia are marked as more carbon-intensive than similar products made from other countries. However, the carbon-intensity of most of the products made in Japan is much lower than in other countries. Because of the large differences in the carbon-intensity of similar products, providing such information on products is therefore effective to help consumers take into account environmental considerations when they make purchasing decisions.

Table 12.3 Carbon intensities of selected carbon-intensive products

Products	IDN	MYS	PHL	SGP	THA	CHN	TWN	KOR	JPN	U.S.
Fishery products	1.3	1.2	0.7	1.3	2.0	1.4	0.2	3.7	1.5	1.0
Crude petroleum and natural gas	2.0	0.1	13.9	20.4	0.1	3.5	2.9	0.6	0.1	1.0
Chemical products	1.6	1.0	0.7	0.8	1.3	3.9	0.8	0.7	0.2	0.7
Petroleum and petro products	3.0	4.5	0.2	0.4	0.2	2.4	0.2	0.2	0.1	1.3
Non-metallic mineral products	7.3	1.8	2.1	0.9	2.0	4.7	1.2	1.3	0.6	1.1
Metal products	2.5	1.0	0.8	0.7	1.0	4.7	1.2	0.6	0.4	0.6
Trade and transport	11.8	6.6	3.2	22.1	6.6	20.9	3.0	2.2	0.8	7.5
Electricity, gas and water	2.0	1.4	1.6	0.3	1.2	1.9	0.9	1.6	0.4	0.6

Note: For different product categories, shaded entries in each row indicate top three carbon-intensive products identified by their country of origin. Carbon intensities are measured in kg-CO₂/\$ at 2000 value.

Source: Author's estimation

From the perspective of global value chain management, the MRIO analysis was applied to trace the contribution of each upstream stage to the total emissions induced by the production and consumption of a product. For example, the total carbon intensity of non-metallic mineral products (e.g., cement) originating from China is 4.7 kg-CO₂ per dollar of production, of which 63% (3.0 kg-CO₂) is attributable to the energy consumption required to fulfil the production, 26% (1.2 kg-CO₂) is attributable to the manufacturing process and 1% (0.5 kg-CO₂) is attributable to other stages (including stages located in other countries) in the value chain.

This information helps identify the most carbon-intensive stages and their geographical locations. Allocating limited resources to address these carbon-intensive “hot spots” through investments in abatement and technology advancement can achieve effective reduction and thereby improve the overall environmental performance of a product. As the value chain of a product links producers and consumers located in different countries, bilateral and regional cooperation in technology transfer and financial support, in particular from industrialised countries to developing countries, are therefore important.

3.2 Applications of embodied emissions

As presented in the case study for ten economies in the Asia-Pacific region, embodied emissions can be used as an effective indicator of communication among different

stakeholders in the global value chain of a product from the upstream production to the downstream consumption. Several applications may be recommended to achieve SCP in a cost-effective way through bilateral, regional and international cooperation.

First, many environmental problems are attributable to international trade directly or indirectly because environmental costs are not internalised, especially in developing countries where environmental requirements are usually low. Setting a global uniform carbon price on emissions embodied in tradable goods can help internalise carbon costs which will be taken up by the final consumers (For reference prices from current carbon trading markets, please see Capoor and Ambrosi (2008)). By doing so, good environmental performance will become a new gradient of international competitiveness in addition to traditional factors, such as technology advancement and low costs of labour and resources, for example. Setting a uniform and equitable carbon price equivalency, however, requires bilateral, regional and international cooperation and special considerations of lower income citizens who are generally disadvantaged since their consumption bundle comprises a higher percentage of emissions-intensive commodities (Casler and Raffui 1993; Common 1985; Cornwell and Creedy 1995 a, b; Hamond et al. 1999; Herendeen and Fazel 1984; Roberts 2008; Smith 1992; Speck 1999).

Second, with the knowledge on carbon-intensive “hot spots,” major stakeholders or countries in the value chain can work together to mitigate emissions effectively through financial and technological cooperation. Compared to the financial support mechanisms and technological cooperation under the United Nations Framework Convention on Climate Change (UNFCCC), cross-border cooperation among stakeholders in the global value chain is more possible to establish because they are pursuing common benefits from the global value chain. When industrialised countries are downstream consumers and developing countries are upstream producers, industrialised countries can invest in or transfer technology to the “hot spot” production stages in developing countries.

Third, embodied carbon as an indicator has been applied by the corporate social responsibility system and eco-labelling schemes implemented in both developed and developing countries. However, the standardisation of calculation and its practice requires regional and international cooperation.

Fourth, consumption-based accounting systems for national inventories are already becoming popular for dealing with issues such as “carbon leakage” (Tuncer and Schroeder 2009). However the most feasible application is still being debated and data for accounting are not always available. Proper discussion of this issue at UNFCCC and the cooperation between the UNFCCC and the World Trade Organization (WTO) are imperative to address the connections between climate change and international trade.

4. Cross border energy infrastructure development for sustainable energy use

4.1 Efficiency improvement in terms of electricity production in Asia

It is a paradox of growth that many resource rich countries are suffering from poverty and lack basic needs in contrast to the luxury and affluent lifestyles in comparatively resource poor but economically developed countries. The apparent curse of natural resources is a well documented phenomenon. Several researchers like Gylfason (2001), Sala-i-Martin (1997) and others have found a negative correlation between natural resource abundance and economic growth. Kronenberg (2003) further argued that the curse of natural resources is also true in transitional economies facing increasing demand for

primary goods in the domestic market. For example, while a very large amount of the resources available in the world are in the Asian region, the most energy consuming regions are North America and European countries as well as Japan. In spite of vast energy resources in hand, the majority of the Asian developing regions suffer from a lack of electricity supply. Disparity and asymmetric distribution of consumption of electricity, one of the primary needs of modern society, among the countries and regions across the world are very pronounced in Asia.

This region also has a very high dependency on energy for its economic growth measured in terms of GDP-Energy elasticity (1.23%),¹² which is twice as high as the world average (Wu 2005). High population growth, especially in India and the Southeast Asian countries, is an additional hurdle in meeting burgeoning energy demands. Reeling under these three major growth impediments, the Asia-Pacific region needs to efficiently and effectively utilise resources to ensure uninterrupted development. According to the International Energy Agency (IEA), Asia is now at the top of the list in terms of annual energy demand increases with 3% annual growth rate of primary energy demand to sustain the current level of economic development (IEA 2008).

The electricity sector itself will consume around 20% of the total primary energy supply in the world by 2015 and around 30% in the Asian region. This means that one third of the total primary energy demand in Asia will be for electricity generation. Being the single largest energy sector of the economy, the electricity sector needs to deal with issues such as lowering the GDP-Energy elasticity for better energy security, helping to reduce poverty by energising more than 300 million people in the region who are excluded from modern electricity supply, and protecting the global environment by restricting the emissions of GHGs and air pollutants through cleaner and greener technologies.

4.2 Mapping of regional electricity demand and supply

By 2030, the Asian region will consume more than 37% of the total global electricity, which would be mainly generated from coal fired power plants (IEA 2008). There will be around 6% efficiency improvement in the coal fired power generation technology from 31% to 37% over the next two decades, though the improved level will be still lower than the OECD's average efficiency level of 41%. These projections indicate a huge amount of resource consumption by this region for power generation. IEA's World Energy Outlook (IEA 2008) further predicted that the majority of the power in this region will be generated through conventional coal fired power plants mainly because of low production costs.

The reasons for low cost can be further attributed to various factors like abundance of coal resources in the region and its relatively low cost of extraction, cheap proven technologies and no binding commitment for emissions reduction especially under the Kyoto Protocol (except Japan). Due to various geopolitical and investment uncertainties, natural gas and oil resources may not be fully exploited compared to coal (IEA 2008). China and India will produce cheap steam coal for power generation not only to meet their domestic demands but also for exporting; many countries in this region will remain dependent on imported coal despite their rich natural gas and oil resources. This can affect the region's electricity market in two ways. First, it restricts the use of comparatively cleaner fossil fuel like natural gas. Second, it increases the international coal price which further impacts on the profitability of the power companies.

Thus, it is very important to address geopolitical and investment uncertainties against geographically distorted resource availability for countries to achieve the required level of efficiency and effectiveness in electricity generation and supply. Table 12.4 shows the

distribution of energy resources (proven reserves) across the Asian region compared to their respective electricity demand growth rates.

Table 12.4 Proven reserves of energy resources in Asia

Sub Region	Coal (billion tonnes)	Oil (million tonnes)	Natural Gas (billion cubic meter)	Hydro Power (giga watt)	Electricity demand growth
South Asia	212	913	2,828	215	5-6%
East Asia	64	1,628	6,520	409	14-16%
West & Central Asia	46	22,278	33,367	128	2-3%

Note: South Asia sub region includes: Afghanistan, Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka

East Asia sub region includes: ASEAN countries, plus China

West & Central Asia includes: Kazakhstan, Turkmenistan, Uzbekistan, Tajikistan, Kyrgyz Republic and Iran

Source: Bhattacharya and Kojima (2008)

Though West and Central Asia record the lowest electricity demand growth rates in the region, they are endowed with plenty of natural resources along with mothballed infrastructure for power generation which was started under the Soviet Union regime but could not be completed. Those incomplete power plants and abandoned natural resources are now surplus resources for the sub-region after the break-up of the Soviet Union in 1999. With the current economic condition of the sub-region and its future prospects to 2030, it has been estimated that this region would be able to supply more than 11 tera watt hour (Twh)¹³ of power every year to the rest of Asia by operating existing power plants at full capacity without additional investment. Similarly, some countries of the Greater Mekong Subregion (GMS) in the eastern part of ASEAN are endowed with massive hydropower potential along with natural gas which is so far untapped and is surplus to this subregion's economic growth prospect.

4.3 Sustainable consumption of electricity in the context of the Asian economy

It has been estimated that the current level of energy reserve resources could be sufficient to fuel Asian economic growth provided an efficient and effective utilisation of these resources is achieved through regional cooperation. Single country stand-alone efforts may not be sufficient to allow for a stable and reliable electricity market in the coming years foreseeing the trends of various major influencing factors, including fuel supply. Traditionally, national power development plans recommend setting up new power plants to satisfy future demand. These plans normally get built on relatively certain domestic fuel supply predictions and uncertain international procurement plans to diversify fuel supply sources. Nevertheless, external and internal factors constrain the power plants' efficiency due to extreme uncertainty in the global energy supply market which is often beyond a country's control. International terrorism, oil tanker piracy, exporting countries' domestic policy changes, natural disasters and even seasonal fluctuation of river water flow (mainly for hydropower) are some examples which can seriously jeopardise the energy procurement plans of importing countries.

Impacts of such uncertainties can be further observed through the decreasing reserve margins¹⁴ of importing countries' national electricity markets across the Asian region (APEREC 2001) which endangers the energy security situation. It further compels countries to adopt more expensive financial risk hedging mechanisms to protect their fuel and resource supply for a longer period (over 15 to 20 years). Sometimes the costs

of such risk mitigation measures can reach 50% of the total cost of production and can plunge the entire market into deep uncertainty. It has also been estimated that cross border electricity grids can reduce an individual country's reserve margin requirement by around 5% (APERC 2001) which can save a significant amount of resource utilisation.

Greenfield power projects,¹⁵ which are now mushrooming all across this region in the name of meeting the future demand for electricity, are not only consuming all sorts of additional resources including land, water, energy and capital during the commissioning of the plants but also restricting alternative utilisation of these resources for other developmental needs far into the future. If a greenfield project can be avoided with an alternative route to meet future demand, then the saved resources can be utilised for other urgent and developmental purposes like agricultural production and social infrastructure development or for more environmentally benign power production. Full load operation of existing plants ensures full scale utilisation of the infrastructure, higher economy of scale and better system efficiency which could all help to avoid greenfield power projects and reduce the average costs of electricity production and subsequent tariff reduction.

It will be effective to have a flexible resource utilisation policy, instead of resource locking policy, to fuel Asian development in a sustainable manner.

In this context, revitalising outdated power infrastructure built under the Soviet Union regime, re-energising undersupplied power plants and conducting systematic renovation and modernisation (R&M) of the older plants to increase the heat rate¹⁶ can be very effective. Moving one step further, cross border grid linkages can also help to manage the load of a particular country through power trading, using the time difference

in peak and off-peak power demands in different countries. For example, India can import power during its evening peak times from Thailand which is 1.5 hours ahead and during their own off-peak zone during that time. This type of cross border electricity load management is quite reasonable and efficient in terms of resource utilisation. Therefore, it will be effective to have a flexible resource utilisation policy, instead of a resource locking policy, to fuel Asian development in a sustainable manner. Sustainability ensures economic growth along with social and environmental protection and stability. Cross border electricity trading can ensure all these outcomes for Asia by providing efficient selection of the location of new power plants (if required), by efficient designing of the power plant based on domestic as well as cross border demand so that plants can operate at full load capacity from the beginning, and by efficient selection of technology and fuel sources to become cost competitive.

It is estimated that the total potential of cross border electricity trading possible within the Asian region is around 200 Twh per year, which otherwise needs to be generated from dirtier fossil fuels like coal. Table 12.5 shows the potential cross border power projects in Asia with detailed information on sources and capacity of transmission. This table shows that around 300,000 MW of hydropower can be promoted purely for cross border power trading purposes where the proposed ASEAN grid interconnection could play a major role. Least developed countries like Lao PDR and Bhutan, blessed with an abundance of hydropower potential, can really make the difference in the regional electricity availability scenario.

Table 12.5 Potential cross border power projects in Asia

Sub Region	Total Installed Capacity (MW)	Maximum Power Transmission (Twh/y)
South Asia (SA)	11,934	58.2
	- Hydro: 8934 (75)	- Hydro: 36.4
	- NG: 1500 (12.5)	- NG: 10
	- Grid Interconnection: 1500 (12.5)	- Grid interconnection: 11.8
East Asia (EA)	20,825	102.0
	- Hydro: 13,625 (65)	- Hydro: 47
	- Grid Interconnection: 7200 (35)	- Grid Interconnection: 55
West and Central Asia (WCA)	9,700	40.4
	- Hydro: 7,300 (75)	- Hydro: 23.6
	- NG/Thermal: 1000 (10)	- Thermal: 6
	- Grid Interconnection: 1400 (15)	- Grid interconnection: 10.8
<i>Total</i>	42,459	200.6
	- Hydro: 29,859 (70)	- Hydro: 107
	- NG/Thermal: 2,500 (6)	- NG/Thermal: 16
	- Grid Interconnection: 10,100 (24)	- Grid interconnection: 77.6

Note: Figures inside the parenthesis is the % to total capacity in bold.

Source: Bhattacharya and Kojima (2008)

4.4 Impacts of cross border electricity projects

In the context of orienting the electricity sector towards SCP, cross border energy infrastructure projects play a vital role. From the sustainable consumption point of view, it encourages efficient utilisation of natural resources for power generation by reducing unnecessary greenfield power projects, by improving the plant load factor of existing plants, and also by enhancing the efficiency of older plants through regular and systematic R&M activities required for maintaining the grid supply code.¹⁷ By ensuring these measures, cross border power projects actually optimise the resource consumption for power production and make potentially locked-in resources available for other uses. From the sustainable production point of view, such projects address three main concerns for narrowing the development gap within the region, discussed at the beginning of this section. Sustainable production of electricity actually reduces the GDP-energy elasticity for the region through efficiency improvement and helps to achieve a better level of energy security. It further strengthens the financial sustainability of companies as well as governments. It has been estimated that the regional net monetary benefits of such cross border power projects, which can actually create a multiplier effect in the economy, can be around \$3.5 billion per year with maximum benefits to the East Asian subregion (Bhattacharya and Kojima 2008).

Moreover, cross border energy infrastructure projects may create net positive impacts on the environment by reducing atmospheric emissions due to efficient and effective production mechanisms. Note, however, that the social and ecological impacts of large hydropower projects can reduce the net benefits. Table 12.6 shows how these cross border projects can affect the five major environmental indicators in this region. Major benefits come from reduced GHG emissions and local health impacts due to inter-fuel substitution (coal versus hydropower) and grid interconnection. Therefore, such projects can also work as mitigation activities in the context of combating climate change. The most heavily advantaged subregion is East Asia, including China.

Table 12.6 Environmental impacts of cross border energy project

Impacts	Sub Region : SA		Sub Region : EA		Sub Region : WCA	
	Coal-Hydro (net benefit)	Grid Interconnection (net benefits)	Coal-Hydro (net benefit)	Grid Interconnection (net benefits)	Coal-Hydro (net benefit)	Grid Interconnection (net benefits)
Health effect	221.31	71.74	285.76	334.40	143.49	65.66
Crop loss	-8.85	-2.87	-11.43	-13.38	-5.74	-2.63
Material damage	5.62	1.82	7.26	8.49	3.64	1.67
Acidification	58.24	18.88	75.20	88.00	37.76	17.28
Global warming	457.18	148.21	590.32	690.80	296.42	135.65
Total	733.50	237.78	947.11	1108.32	475.57	217.63

Note: SA: South Asia; EA: East Asia; WCA: West and Central Asia. All the figures are in \$ million at year 2000 constant value.

Source: Estimated by the authors using basic data from Voss (2000)

A case study on the impacts of investment in cross border power projects between China and Thailand further corroborates the importance of such projects in the context of SCP of the electricity sector of this region. According to the case study, the China-Thailand cross border power projects investment will ensure unaffected economic growth in terms of GDP along with increasing employment (which contributes to poverty reduction) and reduced emissions (which contributes to protecting the environment). Table 12.7 shows that the Jinghong-Nuozhadu hydropower project, the largest energy project in the Lancang-Mekong basin, is expected to boost the GDP of Thailand and China by 3.45% and 1.15%, respectively, by increasing electricity supplies to Thailand and China by 47% and 12%, respectively, by 2020. It also shows that this project would reduce CO₂ emissions from the two countries by 1 million tonnes per annum respectively.

Table 12.7 Impacts on China and Thailand from cross border energy project

	GDP (\$ million)	Labour payment (\$ million)		SO _x (thousand tonnes)	CO ₂ (million tonnes)
		Skilled	Unskilled		
China	75.9	3.7	-13.8	0.9	-1.0
Thailand	45.7	-1.0	-6.1	-0.2	-0.9

Source: Bhattacharya and Kojima (2008)

In summary, cross border energy projects, especially electricity generation and transmission projects, can bring overall benefits to regional SCP by improving the economic, environmental and social well being of the people. On the one hand, such projects optimise the utilisation of exhaustible natural resources for electricity production, which promotes sustainable production of electricity and on the other hand, promotes sustainable consumption of resources for human utilisation. Consequently, such projects can help national governments to promote sustainable development.

Nevertheless, cross border energy projects have their own inherent risks due to uncertain negative external influences. Sudden changes in bilateral relations between the countries (such as between Thailand and Cambodia, or India and Bangladesh, for example) or even sudden insurgencies created by militant activities across the border can disrupt the supply of power. Even changes in domestic power policies of importing countries can

also negatively influence the viability of such projects. Amidst the growing geo-political instability of this region, cross border energy projects might require additional expenses for physical protection and risk covering insurance premiums which are not considered in this current analysis. It is therefore prudent to consider such risks while planning for such projects.

5. Conclusions

This chapter emphasises the importance of regional perspectives to promote SCP, and demonstrates, based on quantitative case studies conducted by IGES, that SCP requires collective action and coordinated efforts through regional and international cooperation to address potential negative spillover effects and/or to facilitate effective implementation of domestic efforts. The key messages extracted from the three case studies are as follows.

First, seeking win-win solutions through regional and international cooperation is essential to promote SCP in the true meaning, that is, to provide consumption opportunities that would allow everybody to meet their needs without exceeding environmental carrying capacity (UNEP 2005). In the worst case, one country's efforts to promote SCP in that country could have adverse effects on SCP in this sense. The first case study shows that Japanese efforts to achieve a low-carbon society by domestic measures alone may have adverse economic and environmental impacts in terms of increased CO₂ emissions for other countries, while the introduction of regional cooperation may enable the region to reduce CO₂ emissions collectively with relatively insignificant real GDP loss. The third case study demonstrates, with an example of regional energy infrastructure development, that regional cooperation could bring about win-win solutions including economic development, poverty alleviation and environmental improvement. The poverty alleviation aspect of SCP must be taken into account, especially for developing countries where poverty is still the first priority to achieve sustainable development.

Second, with economic globalisation and the influence of transboundary environmental pollution, promoting SCP domestically may be neither efficient nor effective in some cases, given the context and conditions present. The first case study provides some supportive evidence that the introduction of regional cooperation may improve effectiveness and efficiency of Japanese LCS measures. The second case study demonstrates that decoupling resource use and emissions from domestic economic growth and shifting the "hidden impacts" to other countries, especially to countries with lower environmental requirements or lower technologies through outsourcing and off-shoring activities, were also not effective in achieving dematerialisation and decarbonisation at the global level. Collective action is required.

Third, production and consumption are paired in the SCP domain and should be considered in a systematic way. The second case study points out the necessity to take into account both the upstream (production) and the downstream (consumption) sides in order to reduce the total emissions embodied in the global value chain.

Fourth, it is important to select the appropriate level, e.g., international level, regional level, bilateral level, or product level, to address specific SCP issues for effective implementation of cooperation. For example, implementing a cap and trade scheme for carbon at the global level might not be efficient due to high transaction costs but could be efficient at the regional or bilateral levels. Similarly, while North-South technology transfer at the global level has entailed many difficulties, a small number of stakeholders who face the same economic benefits and environmental costs involved in the value chain of

a product could make collective efforts through investment or technology transfer to solve the issues surrounding the region's "hot spots."

Finally, both the developed and developing world should be more open to cooperation and make pragmatic efforts to search for better solutions.

The future research agenda includes the need to improve the reliability of data through field surveys and an elaboration of analytical tools and technology specifications. It may also be useful to connect quantitative policy impact assessments with political science analysis to address implementation feasibility issues. With these improvements, quantitative policy impact assessments will greatly contribute to implementing regional cooperation towards SCP by demonstrating potential benefits in a tangible manner.

Notes

1. Ecological rucksack, or material intensity per unit of service (MIPS), is the total quantity of the natural material exploited for the whole life cycle of a product from its generation to its disposal.
2. For the potential contribution of LCS to SCP from the energy security perspective, see Kojima (2010).
3. It assumes that households need to buy more energy efficient equipment.
4. ASEAN +3 consists of 10 Association of Southeast Asian Nations (ASEAN) countries (i.e., Brunei Darussalam, Cambodia, Indonesia, Lao P.D.R., Malaysia, Myanmar, the Philippines, Singapore, Thailand and Viet Nam), Japan, China and the Republic of Korea.
5. BAU corresponds to situations when no actions consisting of the LCS scenarios are taken.
6. In this study, the collected carbon tax is transferred to households in a lump sum.
7. Indeed, a 30% reduction from the 1990 level corresponds to almost a 60% reduction from the BAU emissions in 2020 according to the REPA simulation results.
8. Such attempts to find win-win solutions by scaling up the amount of financial assistance failed due to technical reasons, mostly likely due to too large exogenous policy shocks.
9. A supply chain and a value chain are complementary views of an extended enterprise with integrated business processes enabling the flows of products and services in one direction, and of value as represented by demand and cash flow in the other. Both chains overlay the same network of actors. When we talk about supply chains, we usually talk about the direction from the source to the customer. Value flows the other way and the customer is the source of value.
10. 1 Mt = 10⁶ t. In the original article, the authors calculated using the unit mega tonnes of carbon (Mt-C). Here we converted the unit to mega tonnes of CO₂ (Mt-CO₂) using the formula 1Mt-C=44/12Mt-CO₂.
11. For details, please refer to Miller and Blair (1985). For the application of MRIO, Peters and Hertwich (2008).
12. GDP-Energy elasticity measures the energy requirement for every unit of GDP of the country; the higher the elasticity, the higher the energy consumption for its economic activities, which thus measures the energy dependence of the economy.
13. 1 tera watt hour (Twh) = 10⁹ kilo watt hour (Kwh).
14. A measure of available capacity over and above the capacity needed to meet normal peak demand levels. For a producer of energy, it refers to the capacity of a producer to generate more energy than the system normally requires. For a transmission company, it refers to the capacity of the transmission infrastructure to handle additional energy transport if demand levels rise beyond expected peak levels.
15. Greenfield power projects are those projects which are completely new and being carried out on empty land where it is not necessary to remodel or demolish existing structures.
16. A measurement used in the energy industry to calculate how efficiently a generator uses heat energy. It is expressed as the number of BTUs of heat required to produce a kilowatt-hour of energy.
17. Grid code covers the operating procedures and principles governing the interactions between the power producers, transmission companies and distribution companies to achieve a certain level of system reliability.

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Section V

Conclusion

The final section aims to bring together the key messages overall and addresses the overarching questions of this White Paper. The chapter begins by revisiting the original hypothesis and the foundational issues of SCP for the Asia-Pacific region such as drivers of consumption, the emerging middle-class of consumers, the varying roles of stakeholders, the right policy mix for the context, and synergies with poverty alleviation agendas and efforts to improve quality of life and well-being – such as the Millennium Development Goals.

This White Paper covers an extensive range of topics and contexts and contains many unique insights and responses. Within this diversity three major topics emerged throughout – varying roles for each stakeholder group, utilising various policy types and recommendations which are dependent on their respective context, and taking into account the enabling factors for implementation. These are summarised in three tables with reference to the respective chapters to guide readers in finding more about each topic.

By revisiting the overarching questions and questions for policy makers, business leaders, educators, and consumers the authors bring together concepts and findings from throughout the White Paper and indicate areas for further attention for policy and research. Priority research areas are identified by drawing on each of the individual preceding chapters, followed by final words on SCP in the Asia-Pacific region.

Chapter 13

Conclusion

Chapter 13

Conclusion

Peter King and Robert Kipp

Revisiting the hypothesis

Researching and writing for this White Paper began with a simple premise—that through policies directed at engaging and enabling consumers to change their behaviour and patterns of consumption, subsequent systemic changes would take place, not only in production systems but also with subsequent effects on the underlying structure of the economy. Consumer demand and consumption, if shifted to a sustainable pattern, in theory, should influence producers to meet that demand with appropriate and sustainable production processes, greater product choice, and expanded consumption options (including services instead of products). In turn, increased choice and expanded consumption options would drive down relative prices, make sustainable goods and services more affordable and accessible, and set up a virtuous cycle leading to sustainable consumption and production (SCP). The focus on the consumer suggests policy actions which would result in (i) reducing some forms of unsustainable consumption, such as fossil fuels; (ii) increasing demand for other forms of consumption, such as renewable energy; and (iii) transforming conspicuous consumption into less ecologically demanding alternatives which could have greater personal satisfaction than found in mass consumerism.

The intent was to explore this line of thinking across many contexts in Asia-Pacific and develop new lines of thought on SCP in the region. The result is a unique set of insights on SCP in various contexts and with different combinations of stakeholder groups, roles, and responsibilities. In this final chapter these findings are brought together and the guiding questions of the White Paper are revisited, followed by final words to conclude and, hopefully, to encourage further research and action for SCP in the Asia-Pacific region.

Since SCP entered the international picture as a part of Agenda 21 in 1992 there have been two particularly challenging aspects—transforming production and market systems to support sustainable production and consumption, and realigning social and economic institutions towards new concepts of development and growth which would sustain or improve quality of life while minimising environmental impacts. These challenges were clearly based on acknowledging the unsustainable overconsumption of most of the world's developed populations, and the trend among the emerging middle class of consumers in developing economies to follow those same consumption patterns. Inevitably these trends would take us to the limits of the Earth's carrying capacity to provide for these consumption levels and absorb the resultant emissions and waste.

In Asia, the great majority of achievements to date on SCP have come through technological innovations and production efficiencies, with inadequate attention given to social and economic changes that would impact on the consumption side of the equation. There is less literature and research on sustainable consumption and fewer tangible measures than those available for production systems or recycling processes, as SCP

has its roots in cleaner production initiatives. Improving efficiency and reducing waste in a factory, while difficult enough, is much more straightforward than changing individual desires for a new car or revealing personal preferences for less wasteful packaging. As a result there is an imbalance when all the policies on sustainable consumption are added together in that they do not yet add up to the promise of the big picture of sustainable consumption driving sustainable production.

It may not be possible to clearly define sustainable consumption patterns in a simple way so as to satisfy all contexts, in addition to the complications arising from the many reasons for consumption. Teenagers in Bangkok purchasing local fashion brands; the convenience and price-oriented continuous consumption by households; new urbanites in Beijing and Mumbai driving to work in their newly affordable car—each represent a different reason for consumption and warrant a suitably varied policy approach to support measures to consume less, to consume differently, and to live sustainably. In addition to the consumers are all the other stakeholders in the lifecycle of a product or service—those who extract the natural resources, the processor and transporter, the packager and recycler—each of whom work in a particular context with a unique and varying contribution to SCP. The previous chapters show that by and large a multistakeholder approach with a dynamic policy mix is the most appropriate course of action, but that the role of specific stakeholders can vary or even be quite limited depending on the context.

Another set of challenges relates to poverty alleviation, not only with the question of how to continue making progress on such important agendas as the Millennium Development Goals, but also ensuring that the outcomes—short and long term—are sustainable. Unsustainable consumption of course remains undesirable regardless of whether the consumer is poor or rich. In the first chapter, the term “aspiration treadmill” was used, which describes efforts to constantly strive for greater income and greater consumption, while one’s lot in life remains relatively unchanged. Without the element of sustainability, of taking a perspective which accounts for economic, social, and environmental considerations for current and future generations, poverty reduction efforts may result in the position of the poor remaining relatively unchanged due to changing climatic conditions and stiffer competition for resources. In other words, an alleviation treadmill occurs across populations as ecological degradation undermines efforts to improve quality of life and well-being.

However, as the cases in this White Paper have shown, there are significant changes taking place in policies and in people’s minds which are encouraging developments, although there is still a long way to go. In summary, there is limited support for the starting hypothesis but an increasing recognition that such relationships between consumers and producers are not only essential but also feasible in the context of the development challenges facing the Asia-Pacific region.

Stakeholders at the centre of SCP

As has been extensively discussed in the previous chapters, it is difficult for any single stakeholder group to act alone, in particular end consumers, to effectively change the complex system of production and supply chains. In addition, focusing on one stakeholder group to the exclusion of others will not result in the broader systemic changes in society that are essential for SCP to take root. In Table 13.1, each of the major stakeholder groups are listed together with a description of their primary roles and responsibilities in SCP and the corresponding chapter in which they are the primary focus. Each group of course has many roles to play and actions to take, highlighting the

key message of this White Paper of the urgent need for multistakeholder cooperation, coordination, and communication.

Table 13.1 Stakeholder roles

Stakeholder	Primary role and responsibilities	Chapters and topic
Local governments	Foster conditions for sustainable consumption and production practices in their communities to engage and coordinate with other stakeholder groups; implement if necessary or support implementation by other stakeholders.	Chapter 2 – Packaging: waste management Chapter 3 – Education: non-formal and informal Chapter 5 – Local initiatives: support of mayors and other local government agencies Chapter 6 – Community engagement
National governments	National legislation and regulation to redirect consumption to sustainable goods and services; leading through green procurement and choice editing.	Chapter 2 – Packaging Chapter 3 – Education Chapter 4 – Business and the environment Chapter 5 – Local initiatives Chapter 6 – Community engagement Chapter 7 – Water consumption Chapter 8 – Forests Chapter 9 – Renewable energy Chapter 10 – Agriculture Chapter 11 – Climate imperatives Chapter 12 – Transboundary issues
International organisations	Negotiate global agreements; transfer of technologies and harmonised standards.	Chapter 5 – Local initiatives Chapter 11 – Climate imperatives
Nongovernment organisations	Operate in areas governments may not have the will or capacity to work in, by utilising access to local networks and international know-how and resources.	Chapter 3 – Education Chapter 5 – Local initiatives Chapter 6 – Community engagement
Businesses and retailers	Environmental information disclosure; influence consumers to consume and use products sustainably, innovate ecologically sound practices throughout the value chain, and eliminate unsustainable products and practices.	Chapter 2 – Packaging :eco-labelling, embedded carbon Chapter 4 – Business and the environment: influence through global supply chains
End consumers	Access information and discriminate against ecologically unsound producer choices, thereby making informed, ecologically sound purchasing decisions; at the end of use, ensure proper disposal.	Chapter 2 – Packaging Chapter 3 – Education Chapter 4 – Business and the environment Chapter 5 – Local initiative Chapter 7 – Freshwater Chapter 9 – Sustainable energy Chapter 10 – Food safety Chapter 11 – Climate imperatives
Brand owners	Environmental and health information on labels.	Chapter 2 – Packaging: standardised containers suitable for recycling
Investors	Socially responsible investment that precludes investment in unsustainable production.	Chapter 4 – Business and the environment

Each stakeholder group has defined roles which they may typically play, while collaboration, cooperation, and agreement among the stakeholder groups are necessary to achieve the desired policy outcomes. No stakeholder group alone could or should be responsible or held accountable for the success or failure of SCP regardless of context.

Policy mixes

As this White Paper has shown, some sectors and contexts have more potential for government policies to make a difference by emphasising either production or consumption—despite the inherent duality of SCP. In addition, analysis across the broad contexts detailed in this White Paper has shown there are no silver bullets or simple one-shot policy solutions for SCP. Each chapter and the case studies within have outlined numerous policy types and recommendations which are dependent on their respective context. Table 13.2 summarises these policy types and shows examples of some of the options that could be undertaken. For this summary, these policies are taken out of their original context, but a reference is given to chapters where fuller detail of the context and situations where these options were or can be engaged.

Table 13.2 Policy recommendations for Sustainable Consumption and Production

Type of Policy	Examples	Source Chapter
Command and control	Food safety standards Choice editing Extended Producer Responsibility Building regulations Norms and standards Forest product trade regulation Mandatory corporate environmental information disclosure	Chapter 10 – Agriculture Chapter 2 – Packaging Chapter 2 – Packaging Chapter 11 – Climate imperatives Chapter 9 – Sustainable energy Chapter 8 – Forest Chapter 4 – Business
Market-based	Pollution charges Water pricing Economic incentives/disincentives	Chapter 7 – Water Chapter 7 – Water Chapter 11 – Climate imperatives
Voluntary	Voluntary corporate environmental information disclosure Voluntary forest certification	Chapter 4 – Business Chapter 8 – Forest
Information-based	Eco-labelling Carbon content labelling Nutritional labelling Social marketing Formal/informal/non-formal education Consumer education Communication and information sharing Capacity development Outreach – workshops, movies, posters	Chapter 1 – Introduction Chapter 3 – Education for sustainable consumption Chapter 4 – Business Chapter 5 – Local initiatives Chapter 6 – Community engagement Chapter 8 – Forests Chapter 10 – Agriculture

Some policies in Table 13.2 can be either voluntary or involuntary, depending on the extent of government involvement. For example, corporate environmental information disclosure can be done voluntarily or through regulation, as can forest certification and choice editing. Additionally, some information-based policies can be voluntary or mandatory, such as eco-labelling, carbon content labelling, and nutritional labelling. Relating to stakeholder groups and the importance of context, there is also variation within types of policy as to which group's actions are voluntary or mandatory. For example, it may be required for a certain type of imported good to be derived from sustainable sources and given an "eco-label," but the end consumers are not required to purchase goods with the eco-label. However if the end consumer is the government, it is not uncommon for procurement policies to include requirements for eco-labelling of all goods procured. So there can be diversity within regulations which allow for voluntary and requisite consumption, as well as voluntary or requisite measures.

Enabling factors for effective policy responses

The purpose of this section is to briefly outline the rationale behind the policy recommendations from each chapter and the enabling factors of the context in which they were made (Table 13.3). Enabling factors include supporting conditions and measures such as other policies, programmes aligned to the objectives and goals of a policy, tools, and initiatives that contribute to achieving the aims of SCP and the recommendations and insights developed in this White Paper. This illustrates that the right mix of stakeholders and policies alone may not be sufficient to achieve SCP unless the appropriate enabling environment is also present or can be created.

Table 13.3 Enabling factors to ensure successful SCP policies

Chapter	Context	Enabling Factors
2. Packaging	Minimising unsustainable packaging in the global value chain.	Policies must target the lead actors (brand owners and retail chains), who have the greatest influence over packaging choices, while empowering other stakeholders through multistakeholder processes.
3. Education for Sustainable Consumption	Consumer education and provision of information.	Make consumers aware of their central role in SCP and empower them to choose responsible, sustainable lifestyles through reflective self-transformation.
4. Business	Corporate environmental information disclosure.	Provision of accurate information for stakeholders; empower stakeholders to generate sufficient pressures/incentives; and combine disclosure with command and control and market-based policies.
5. Local Initiatives	Promoting local initiatives for sustainable consumption.	Proactive actions by coordinators and facilitators to consult with and engage local stakeholders; responsiveness to local issues and concerns; support by local government leaders; and gaining external support.
6. Community Engagement	Empowering communities to undertake sustainable consumption practices.	Analyse and build on the strengths of community characteristics; choose communities open to external influences; motivate and mobilise people; and use multi-stakeholder partnerships to amplify project impacts and safeguard communities from risks.
7. Water	Sustainable water consumption through economic instruments.	Establish clear water use rights through integrated water resources management; create user willingness to pay by providing good and trustworthy services, including accurate measurement of water use.
8. Forests	Realigning tropical forest product trade towards SCP through voluntary and regulatory actions in consumer economies.	Coordinate actions in consumer economies with support to tropical forest managers to improve forest management practices and the security of supply chains to increase supplies of verified legal and certified sustainable timber.
9. Sustainable Energy	Promoting renewable energy for electricity, heating and transport.	Putting a price on carbon, coordinated renewable energy share targets, subsidy-switching from fossil fuel sources to renewable energy, and recognising the co-benefits of renewable energy; capacity building and training, technology transfer, research and development, and good governance; empower the choices of individuals, industries, and communities preferring non-fossil fuel sources for electricity, heating and transport uses.
10. Agriculture	Promoting food security and food safety.	Harmonisation of food safety standards, policy coordination through a lifecycle assessment approach, producer and consumer capacity building and information provision, and better storage infrastructure.

Chapter	Context	Enabling Factors
11. Climate	Minimising the consumption of energy services in the building and transport sectors.	Subsidies and information campaigns to accelerate deployment and drive economies of scale for energy efficient technologies and practices in the buildings sector; investment in bus rapid transit, railways and district heating and cooling; and avoiding the lock-in of unsustainable development driven by carbon-intensive technologies.
12. Transboundary Issues	Promoting regional cooperation in SCP in the Asia-Pacific region.	Avoid policies with negative spillover on neighbouring countries; use existing platforms for regional cooperation; address environmental "hot spots" in the global value chain through bilateral, regional and international cooperation.

Noteworthy from this summary of the enabling factors is the commonality of the importance of multi-stakeholder engagement, alignment of goals and policies, the importance of accurate, timely information to consumers, and the need for leadership roles at different levels.

Revisiting the questions from chapter one

The purpose of this section is to determine if the White Paper has provided answers to the questions posed to various stakeholder groups in chapter 1 by bringing together the key messages of each chapter.

The Overarching Questions

- (i) *Can Asian economies continue to grow at 6-10% per annum without increasing its already unsustainable consumption of energy and raw materials;*
- (ii) *Can Asia decarbonise, dematerialise, and decouple energy consumption, and consume sustainably in the face of widespread Western-style lifestyle aspirations; and*
- (iii) *Can Asian governments be expected to strive for an economic model of prosperity without unsustainable growth, any time soon, given the overwhelming emphasis on tackling the region's enormous incidence of poverty?*

There are no definitive answers to these questions, although this White Paper holds out some tantalising possibilities for making such changes in a timely manner. For example, as Asia urbanises there is no need to follow outdated urban forms, inefficient building designs, or personalised mobility—and Asia is just at the start of a long-term trend towards a predominantly urban society. The need for a low carbon society has been recognised by several governments in the region, and through appropriate policies, the future urban form of Asia could be quite different from the car-oriented, suburban sprawl of countries such as the U.S. Similarly, Asia's profligate use and likely future shortages of water due to climate change can be averted by placing an appropriate price on water, recognising not only its direct uses but also the ecosystem services that it supports, and through integrated water resources management. Ironically, climate change has driven home to decision makers the diverse functions and values of tropical forests, such as biodiversity protection, carbon sequestration, and the provision of ecosystem services. Putting in place a global system that joins the forces of consumer societies and tropical forest managers, however, remains a complex undertaking. A particularly valuable finding of the White Paper is that SCP policies in one country may have negative spillover

effects on trading partners and globally all nations will be better able to move towards a sustainable society if they collaborate and cooperate.

Some questions for policy makers: *To what extent do current subsidies and other perverse incentives impede SCP? Do changes in domestic policy have transboundary consequences that may lead to unsustainable consumption and production in neighbouring countries? Does current government procurement foster SCP? How can governments provide additional incentives to change consumption behaviour? Does government policy ensure adequate choice for concerned consumers (e.g., services rather than goods)?*

In several chapters, the negative influence of subsidies and perverse incentives were noted as impeding factors, especially in relation to water, forests, and energy. Chapter 12 conclusively shows that domestic policy with transboundary consequences can lead to undesirable outcomes in neighbouring countries, as well as demonstrating the global benefits of collaboration and cooperation. Green procurement and choice editing, along with government investments in sustainable infrastructure that reduces energy demand and are supported by renewable energy, along with local government support for sustainable consumption initiatives are seen as key elements in promoting SCP. Government policies such as mandatory eco-labels, corporate environmental information disclosure, embodied carbon labelling, and water pricing, among many other policies referred to above, provide additional incentives to change consumption behaviour. There is less evidence, however, that governments are prioritizing SCP or doing enough currently to ensure adequate choices for concerned consumers –and as a result are continuing to allow policies which contribute to unsustainable consumption and production to persist.

Increased policy attention to measures like choice editing, such as recent bans on incandescent lighting and car quotas in urban areas, is needed urgently so that consumers have an adequate range of sustainable products and consumption options to choose from.

Some questions for business leaders: *To what extent is consumer demand from Asia's emerging middle class for better environmental information driving changes in production systems in Asia? As Asia is the "factory for the world," how important are changing consumer attitudes in developed country markets in changing Asian producer practices? Are Asian producers anticipating the negative impacts of adverse consumer reactions and potential reputation risks and changing production practices before they are forced to? To what extent are Asian producers going beyond corporate social responsibility (CSR) and "greenwashing" and actually designing and producing innovative green products? Is mandatory environmental disclosure essential, or would voluntary approaches suffice? What is the optimal policy stance of governments from a business perspective? How important are shareholders, investors, and company staff in changing company environmental practices?*

From the evidence presented in the White Paper, there are scattered examples of responsible businesses in Asia attempting to respond to consumer demand for more sustainable products, but this is not yet a groundswell. Companies in China and India, among others, are becoming global leaders in areas like electric cars and motorcycles, wind turbines, and solar panels, but they are still addressing niche markets rather than mass consumption. Voluntary environmental information disclosure seems to work best when it is backed by the threat of command and control regulations or other government interventions. As shown in the packaging examples, while changes are needed across the entire value chain, government intervention will be most effective when it is targeted

at the lead actors, or those with the most power in a chain of relationships. In the case of packaging, this tends to be the brand owners and retailers (often the same entities), who ultimately decide which products and which forms of packaging to put on the store shelves. In other cases, ethical investors and other socially responsible shareholders can be very influential in changing corporate behaviour. Accordingly, policies that exclusively address consumers may be less effective than expected, as consumers may not carry sufficient weight in the decision making chain, in addition to being constrained by the systems of provision and opportunities presented to them—issues which are compounded by the influence of advertising and social norms for consumption and how we spend our earnings.

Some questions for educators: *Is there an adequate curriculum for formal education on sustainable consumption in Asia? What kind of environmental information should be produced to meet the information needs of concerned consumers in different age groups? What can we learn from previous successful education campaigns in changing consumer behaviour? What is the government's role in promoting education for sustainable consumption? How important is comprehensive environmental information as an input to education for sustainable consumption? Who is regarded as a competent and trusted provider of such information?*

The chapter on education for consumers points out that to achieve the aims of SCP education needs to go beyond formal education to include non-formal and informal education as well. Nevertheless, in the case examples from Northeast Asia, the governments of Japan, China and Republic of Korea have all provided mandates to their governmental agencies to begin promoting responsible consumer behaviour for a low-carbon society and to initiate educational campaigns on sustainable consumption. The eleven cases offer useful lessons for expanding education for sustainable consumption throughout Asia. The importance of accurate, meaningful, and timely information was stressed and the governments have a key role in ensuring that such information is provided to consumers. The issue of trusted information providers is critical, as “greenwashing” provides a convenient excuse for consumers not to change their consumption patterns. Sustainable consumption can never be achieved only by individual consumers simply switching over to green products—education and information play key roles in changing behaviours and developing innovations for low-carbon pathways.

Some questions for consumers: *Dominant cultural patterns that view increasing consumption as normal and natural are unsustainable. If (or when) this becomes the dominant cultural paradigm in Asia, the world's ecosystems will collapse, probably irretrievably, and it is uncertain how many people the planet will be able to accommodate. Of course, we must all continue to consume to stay alive, and no one would deny the right of the world's poor to achieve a basic level of comfort and well-being through increased consumption. Can consumers in the developing and developed worlds find a level and form of consumption that not only meets human needs but is also sustainable?*

There is some debate over whether consumers in Asia will automatically follow a similar consumption path to their cohorts in the U.S. and Europe. There is a rather romantic notion that Asian consumers will readily identify with traditional consumption behaviour, such as the “*mottainai*”¹ movement in Japan or Mahatma Ghandi's “homespun” traditional clothing. There is no doubt that very large parts of Asia continue to practice traditional forms of consumption, as poverty allows for no other options. However, once lifted out of poverty, mass consumption appears to be sufficiently seductive to become a global phenomenon. This White Paper confirms the findings of many other authors that resource constraints or the ability of the Earth to absorb wastes will eventually stretch

one or more of the planetary boundaries to the breaking point, with the usual response to simply shift to another constrained resource and continue the cycle. The challenge remains to find forms of consumption and production that meet human needs for current and future generations, without crossing the thresholds of the planet's ecosystem services, and working to replicate or develop these practices to suit the local context while avoiding free riders and transboundary negative externalities. Progress towards a low carbon society, as illustrated in several of the chapters, is evidence that consumption patterns are beginning to change, but much more needs to be done.

Priority research areas

The purpose of this section is to outline the priority research areas for the region by drawing on the previous twelve chapters.

All of the stakeholder chapters emphasise the need for additional research on effective incentives for participation, standards and labelling information to guide consumers and producers, regulatory and economic frameworks that enable or constrain consumer choice, and appropriate infrastructure for sustainable consumption. For sustainable packaging in the Asia-Pacific region more cases and insights are needed on harmonizing packaging standards and on the creation of multi-stakeholder review panels for advancing sustainable packaging. More effective corporate environmental information disclosure, as a multistakeholder approach that links companies, the governments, the community and the market is another aspect of SCP that has to be examined through additional case studies in the Asia-Pacific region. Additional research is needed in the case of local government and community-based initiatives on how successful pilot projects can be scaled up and replicated.

The education for sustainable consumption (ESC) chapter presented a framework for initiating and implementing ESC initiatives, with case analysis provided in support of this framework. In order to develop substantive conclusions on the long-term effectiveness of ESC, additional studies should be carried out on changes in consumer practice following implementation of specific policy measures since the overall goal of ESC is to affect changes in consumer behaviour. Further research should be done on the ways and means of influencing social and cultural patterns of behaviour and creating impacts for paradigm changes aiming for sustainable lifestyles and practice in the Asia-Pacific region. Strong synergies exist between the future research needs on stakeholder groups, in particular for modifying attitudes and the systems that facilitate or constrain behaviour, and the infrastructure that provide the goods, services, and lifestyles of contemporary consumption.

To achieve sustainable consumption in the forest sector, forest management plans must reflect the broad array of principles required to achieve sustainable production over the long-term, such as secure and equitable tenure arrangements, and respect for the rights and needs of forest dwelling and forest fringe communities. Additional research is needed on how sustainable consumption policies in developed countries will affect these broader aspects of forest management and not just the legal source and sustainable logging issues.

In the water sector, issues surrounding privatisation of water and economic instruments such as water trading require additional research to ensure that market-based instruments do not end up as another way to disadvantage the poor. There is no question that effective water pricing can influence sustainable consumption of water,

but subsidies to low income families or minimum water rights as a basic human need may be necessary to balance the equity issues that arise. The effect of water pricing on users that have no way to participate in the market, such as aquatic species, also needs additional research. In agriculture, continuing research is needed on the extent to which organic agriculture can feed the growing world population and the impacts of chemical agriculture on human health and ecosystems.

In the energy sector, lifecycle assessment studies are needed to ensure that consumer choices are guided by comprehensive information, for example, under what conditions rail transport is a more sustainable option than motor vehicles. Are multiple storey houses more energy efficient than single storey buildings? Should a household consumer choose solar photovoltaic energy for the rooftop or a wind turbine? Such major investments are often postponed or avoided entirely due to lack of accurate, reliable information.

In the cross-cutting and transboundary issues chapters, additional research was found to be needed on embodied carbon emissions, and similar issues such as virtual water, in the context of global trading. Identifying carbon-intensive “hot-spots” and then investing in abatement and technology advancement can achieve an effective reduction of greenhouse gas emissions and improve the overall environmental performance of a product. With a consumer-driven global economy dependent on fossil fuels for energy, each consumption decision affects the amount of greenhouse gases released, but additional research is also needed on what else is emitted or discharged. A product choice that merely swaps the nature of emissions from greenhouse gases to toxic or hazardous chemicals would do little to advance the concept of sustainable consumption. Similarly, government policies and product choices that advance environmental protection in the domestic economy but shift pollution to producer countries need to be better understood, so that governments can take regional and global coordinated action.

Final words

This White Paper has focused on a relatively little studied or understood part of the SCP duality in Asia-Pacific—sustainable consumption. Consumers may feel rather powerless in changing the production behaviour of companies let alone the underlying structure of the economy through each consumption choice that they make. The power comes from the accumulated impacts of millions of consumption choices made every day, but there are few obvious avenues to channel that cumulative impact into the driving force of SCP. As illustrated in the chapter on packaging, consumers are forced to take a component of a product that is incidental or surplus to the primary product that they wish to purchase. In other cases, either a more sustainable choice is not available, is not viable, or it is priced too high to be accepted as a mass consumption item. In finding effective ways to get through to consumers and policy makers and mainstreaming SCP, there are still the political, economic, and social infrastructures to be developed to support the 21st century as the Asian century, where the road to development and happiness is not based on greater consumption and accumulation of possessions for all, but improved quality of life and Asian consumers who are proud of their environmental credential and low-carbon growth path.

Governments have a critical role in changing the asymmetry between consumers and producers. First, governments are large consumers in their own right and through green procurement they have sufficient purchasing power to change some production decisions. Second, they can change the balance between sustainable and unsustainable products through command and control regulations, market-based instruments, and

information-based policies, so that unsustainable products are banned or discouraged and sustainable products are given seed funding, subsidies or other incentives, at least until they are competing on the same level as their less sustainable competitors. Third, they can make sure that consumers are educated and informed about the consumption choices they make through mandatory (or voluntary) eco-labelling, embodied carbon labelling, improved content labelling, and information and education campaigns for sustainable consumption.

Businesses exist, of course, to make a profit. Fortunately, many businesses are beginning to realise that increased profits can be made through provision of sustainable products. In some cases, their major stockholders, owners or employees are instrumental in changing company priorities towards sustainable production. In other cases, progressive companies seek first mover advantage or try to stave off impending regulation by moving their product lines away from unsustainable practices. Larger companies, acting through supply chains, can also influence small and medium enterprises through product specification and standards that are designed to meet sustainability principles. It is still the case however that many companies, in particular those working directly with natural resources, continue with unsustainable practices—again highlighting the need for government action and transboundary cooperation, coordination, and communication.

An overwhelming message of the White Paper, however, is that the best results are achieved when all stakeholders work together to achieve a common vision of sustainable development for current and future generations. The preceding chapters illustrate how multiple stakeholders have their individual roles to play but are also encouraged to form partnerships, roundtables, agreements, harmonised standards and other forms of cooperation to achieve the common aspirations of sustainable consumption and production. Multistakeholder cooperation is challenging, but essential for the future of a planet currently imperilled by over-population and over-consumption and facing the prospects, for the first time in human history, of breaching the planetary boundaries that characterise our life support system and the habitats of the millions of species that share the planet with us.

Notes

1. *Mottainai* is a Japanese phrase which has in recent years gone global. The basic meaning is to avoid wasteful use of resources, and generally it is used for avoiding wasteful use in our everyday lives such as energy, food, and water.

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