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The Comprehensive Nuclear Test Ban Treaty and Africa's Developmental and Security Imperatives

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Previous editions of *'Africa's Policy Imperatives'* provided brief overviews (and updates) of Africa's participation in international efforts to strengthen disarmament and non-proliferation through a number of conventions, protocols and agreements. These conventions and agreements include the:

- Treaty on the Non-Proliferation of Nuclear Weapons (NPT);
- African Nuclear-Weapon-Free Zone Treaty (Treaty of Pelindaba);
- Comprehensive Nuclear Test Ban Treaty (CTBT);
- Biological and Toxin Weapons Convention (BTWC);
- Chemical Weapons Convention (CWC); and,
- United Nations Security Council Resolution 1540.

Issue 5 focuses on the Comprehensive Nuclear Test Ban Treaty (CTBT), its adherence in Africa and the potential benefits that Africa can derive from the work of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO). It has been compiled as a result of research undertaken since 2007 by the Norwegian-funded ISS' "Africa's Development and the Threat of Weapons of Mass Destruction Project". This project aims to identify and strengthen Africa's role in these international efforts in the context of the continent's developmental imperatives.

¹ The authors' opinions expressed in this edition of *'Africa's Policy Imperatives'* do not necessarily reflect those of the Institute for Security Studies, its Council, its Trustees or any funder or sponsor of the ISS.

Introduction

In 1996, the Comprehensive Nuclear-Test-Ban Treaty (CTBT) opened for signature in New York following extensive negotiations held at the Conference of Disarmament (CD) in Geneva.

Encompassing the aspirations of global nuclear disarmament outlined in the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), the CTBT bans the testing of any nuclear weapon device. In doing so, it aims to ensure the eventual total elimination of nuclear weapons by constraining the further development and improvement of new types of such weapons.²

The final document of the 2010 NPT Review Conference underscores the importance of the CTBT: *"The Conference reaffirms the essential role of the Comprehensive Nuclear-Test-Ban Treaty within the nuclear disarmament and non-proliferation regime and that by achieving the cessation of all nuclear weapon test explosions and all other nuclear explosions, by constraining the development and qualitative improvement of nuclear weapons and ending the development of advanced new types of nuclear weapons, the treaty combats both horizontal and vertical proliferation. The Conference calls on all States to refrain from any action that would defeat the object and purpose of the Comprehensive Nuclear Test Ban Treaty pending its entry into force, in particular with regard to the development of new types of nuclear weapons."*

A Preparatory Commission was established in 1997 to prepare for the effective implementation of the Treaty once it has entered into force. The Commission is responsible for preparations for, *inter alia*, the first Conference of State Parties, and for ensuring that the Treaty's verification regime is fully operational on its entry-into-force. It also offers a range of technical and legal support for implementation, including assistance with establishing a National Data Centre.

While most states have signed onto the CTBT, it will only enter into force 180 days after it has been ratified by the 44 states that are listed in its Annex 2 irrespective of the number of other states that ratify it. These 44 states formally took part in the discussions held at the 1996 Conference of Disarmament and also

possessed nuclear research or power reactors at that time. As of the end of March 2011, 182 states have signed onto the CTBT and 153 have ratified the Treaty, including three of the five nuclear weapon states. Of these signatories, 51 are African states. However less than 40 have ratified it - the Central African Republic being the last African country to do so, which it did on 26 May 2010. Mauritius and Somalia have neither signed nor ratified the Treaty.

Four African states are part of the above-mentioned 44 states: Algeria, the Democratic Republic of Congo (DRC), Egypt, and South Africa. Egypt remains the only African State, whose signature and ratification is required for the Treaty to enter into force. Globally, it will enter into force and become a legally binding norm when China, the Democratic People's Republic of Korea, India, Indonesia, Iran, Israel, Pakistan and the United States have ratified.

Africa, as the region with the largest number of States hosting International Monitoring System (IMS) facilities and having declared itself a nuclear weapon-free zone has an important supportive role in the rapid entry-into-force of the CTBT – which is now a pressing international imperative. What is clearly needed is a co-ordinated strategy to engage those African States who have not yet ratified the CTBT: Angola, Chad, Comoros, Congo, Egypt, Equatorial Guinea, Gambia, Ghana, Guinea, Guinea-Bissau, Mauritius, Sao Tome and Principe, Somalia, Swaziland and Zimbabwe.

African States that have signed but not ratified the CTBT

Country	Signed
Angola	27 September 1996
Chad	08 October 1996
Comoros	12 December 1996
Congo	11 February 1997
Egypt	14 October 1996
Equatorial Guinea	09 October 1996
Gambia	09 April 2003
Ghana	03 October 1996
Guinea	03 October 1996

² See: <http://www.ctbto.org>

Guinea Bissau	11 April 1997
Sao Tome and Principe	26 September 1996
Swaziland	24 September 1996
Zimbabwe	13 October 1999

African States that have neither signed or ratified

Mauritius

Somalia

The CTBT's International Monitoring System

Once the CTBT has entered into force, compliance with the Treaty will be monitored through an International Monitoring System (IMS). The IMS is a global network comprising of 337 stations that make use of four different technologies capable of detecting nuclear explosions underground, underwater and in the atmosphere. These stations send information to a central data centre in Vienna, where it is analysed and distributed. The system is over 80% completed and on-site inspections will be used to collect additional information on the ground to complement the system.

The four technologies that are used by the IMS are infrasound, seismic, hydroacoustic, and radionuclide technology. While the primary function of these technologies is to detect nuclear weapons explosions, they also have numerous civil and scientific applications. The use of these cutting-edge technologies and scientific methods have the potential to contribute significantly to Africa's sustainable development, knowledge expansion and human welfare.

The benefits associated with the civil and scientific applications of these technologies are extensive. These are listed in **Annex A** below.

The data obtained through the IMS is freely available to all CTBT member states, and the Preparatory Commission offers a range of technical and legal support for implementation of the Treaty, including assistance with establishing a National Data Centre.

In the African context, data from the IMS can be a valuable asset for contributing towards climate change estimates and mitigating the effects of climate change.

There is evidence to show that Africa is warming faster than the global average. Predictions are that the continent will be faced with increased food shortages, water stress, and will experience more droughts, floods and storm surges. Africa's vulnerability to climate change is further exacerbated by numerous socio-economic challenges, including food insecurity, endemic poverty, and environmental degradation.

According to a report by the Intergovernmental Panel on Climate Change (IPCC), the projected effects of global warming on Africa will include:

- Increased water shortages resulting from climate change that will potentially affect millions of people.
- Changes in agricultural production in many countries, including the suitability of agricultural areas, the length of growing seasons, and yield potential, which are all expected to decrease. This will adversely affect food security and exacerbate malnutrition on the continent.
- Local food supplies will be negatively affected by decreasing fisheries resources in large lakes due to rising water temperatures, which may be exacerbated by continued over-fishing.
- Rising sea levels will affect low-lying coastal areas with large populations.
- Mangroves and coral reefs will be further degraded, which may impact tourism.
- Increasing temperatures may result in malaria, Africa's biggest killer, coming back into areas where it has previously been extinguished.³

The potential negative impacts that climate change may hold for the continent, and its low adaptive capacity, will mean that countries will have to prepare to mitigate these impacts as best as possible.

Data collected by the IMS can greatly assist states in this regard. Twenty-four African states host IMS stations that collect either seismological, hydroacoustic, infrasound or radionuclide data. This data can be used to develop mitigation strategies and for the future planning of developmental efforts.

CTBTO Regional Workshops

The Provisional Technical Secretariat (PTS) of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), which

³ International Panel on Climate Change, 2007, <http://timeforchange.org/effects-of-global-warming-by-region-ipcc-2007>

is tasked to promote signatures and ratifications, periodically organises regional workshops for senior officials from various countries. These workshops pursue the double objective of building national and regional capacities on the one hand and promoting the universality of the CTBT on the other. They also contribute to a better understanding of the Treaty's verification regime by offering a useful platform for identifying the existing legal and technical obstacles to becoming a States Party. In addition, the workshops assist in exploring the civil and scientific potentials that the verification technologies offer for the welfare of States. They also offer a unique opportunity for the exchange of experience and expertise among States in the establishment, operation and management of a National Data Centre.

The African Nuclear-Weapon-Free Zone Treaty and the CTBT

In July 2009 the African Nuclear-Weapon-Free Zone Treaty (Treaty of Pelindaba) entered into force declaring that nuclear weapons will not be developed, produced, tested, or otherwise acquired or stationed in any of the countries of Africa, or its associated islands. As a nuclear weapon-free zone, Africa has reinforced the commitments by both NNWS and NWS states to their nuclear disarmament and nuclear non-proliferation objectives.

Given that the impact and effects of any nuclear test, use or accidents involving nuclear weapons cannot be contained within national boundaries or even continents, Conventions relating to the Treaty of Pelindaba are of both regional and global importance.

The CTBT is related to the Treaty of Pelindaba in the sense that it offers a very visible barrier between the peaceful and legitimate use of nuclear energy, and its use for military purposes. They are mutually reinforcing especially with regard to both their 'no-test' obligations and the socio-economic benefits they bring to Africa.

As recently stated by Jean du Preez, the CTBT and the Treaty of Pelindaba are bound in spirit and letter and complement each other in that they both contain legal obligations to prohibit nuclear tests.⁴ There should thus

be no conceivable political and security obstacles [for African States Parties to the Treaty of Pelindaba] to ratifying the CTBT and under the NPT all African States have a legal obligation not to develop nuclear weapons. The Pelindaba treaty further binds them legally not to test nuclear weapons or to allow nuclear testing on their territories.⁵

Five States Parties to Pelindaba have not yet ratified the CTBT and of the 38 African states that have ratified the CTBT, 13 have not yet ratified the Treaty of Pelindaba.

Policy Recommendations

- Additional programmes, including sponsorship arrangements, should be developed to assist African states to fully participate in, for example, the conferences and regional workshops of the CTBTO.
- Greater political support is needed to help place the CTBT into an African developmental context and to highlight the socio-economic opportunities and benefits of total African universalisation and full implementation.
- The five States Parties to the Treaty of Pelindaba that have not yet ratified the CTBT should do so as this will contribute to the momentum towards entry-into-force of the CTBT and allow them to take advantage of the data generated by the international monitoring stations and the range of technical and legal support offered by the Preparatory Commission for the CTBTO.
- The 13 African states that have ratified the CTBT, but not the Treaty of Pelindaba should do so as soon as possible.
- The African Commission on Nuclear Energy (AFCONE), the compliance body of the Treaty of Pelindaba, and the CTBTO's Preparatory Commission should enter into a co-operative arrangement so as to avoid duplication of effort and jointly promote the combined benefits of both Treaties.
- The planned 2012 Conference implementing the 1995 resolution on the Middle East needs to be

Weapons Free Zone Treaty (Addis Ababa, 4 November 2010).

⁵ Statement by Mr Jean du Preez to the First Conference of State Parties of the African Nuclear Weapons Free Zone Treaty (Addis Ababa, 4 November 2010).

⁴ Statement by Mr Jean du Preez, Chief, External Relations and International Cooperation, Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization, to the First Conference of State Parties of the African Nuclear

successfully hosted as this may push Egypt towards completing its crucial ratification.

Annex A: Technologies comprising the IMS and their applications⁶

Technology	CTBT compliance application	Civil and Scientific applications
Infrasound technology	Detects very low-frequency sound waves in the atmosphere produced by nuclear explosions	Data collected can be used to detect: <ul style="list-style-type: none"> • Volcanic explosions; this can assist with aviation safety, • Meteors entering the earth's atmosphere, • Severe storm systems, e.g. Hurricanes <p>Data collected can also contribute to climate change research</p>
Seismic technology	Monitors the ground for shockwaves caused by nuclear explosions	Data collected can assist with rapidly and disseminating information on earthquakes, and can enhance research on the earth's structure. Data can also assist in plane crash investigations by providing data on exact timing
Hydroacoustic technology	Scans the ocean for sound waves emitted by nuclear explosions	Data collected can assist with: <ul style="list-style-type: none"> • Research on marine life, • Acquiring and disseminating data on tsunamis • Improving shipping safety by monitoring underwater volcanic explosions • Improved research on ocean processes, which will lead to improved weather prediction and climate change estimates
Radionuclide technology	Detects radioactive particles or noble gases which could come from nuclear explosions	Data collected can assist with: <ul style="list-style-type: none"> • Research on background radiation (radiation that occurs in the environment from natural and artificial sources) • Accessing information on nuclear accidents • Determining the quantity and movement of air pollutants

⁶ See: <http://www.ctbto.org>