

# FCPR—Forest Conservation Performance Rating for the Pan-Tropics

**David Wheeler, Dan Hammer, and Robin Kraft**

## Abstract

This note introduces and illustrates fCPR (Forest Conservation Performance Rating), a system of color-coded ratings for tropical forest conservation performance that can be implemented for local areas, countries, regions, and the entire pan-tropics. The ratings reward tropical forest conservation in three dimensions: (1) exceeding expectations, given an area's forest clearing history and development status; (2) meeting or exceeding global REDD+ goals; and (3) achieving an immediate reduction in forest clearing. We assign green ratings to areas that meet condition (2); yellow to areas that meet (1) only; and red to countries that fail to meet either condition. We have developed fCPR at the Center for Global Development (CGD), using monthly forest clearing indicators from CGD's FORMA (Forest Monitoring for Action). This first release rates the quarterly conservation performance of 27 countries currently tracked by FORMA, as well as 242 of their states and provinces that contain tropical forests. The 27 countries accounted for 94 percent of tropical forest clearing during the period 2000–2005. Future releases will include additional countries as FORMA begins tracking them.

**JEL Codes:** Q20, Q23, Q27

**Keywords:** forests, conservation, satellite imagery.

## FCPR - Forest Conservation Performance Rating for the Pan-Tropics

David Wheeler  
Senior Fellow Emeritus, Center for Global Development

Dan Hammer  
University of California–Berkeley

Robin Kraft  
World Resources Institute

David Wheeler is senior fellow emeritus at the Center for Global Development. Dan Hammer is a doctoral candidate at the University of California–Berkeley. Robin Kraft is a research associate at World Resources Institute. Thanks to Nancy Birdsall, Ken Chomitz, Michele de Nevers, Darius Nassiry, Nigel Purvis, Bill Savedoff and Fred Stolle for useful comments and suggestions.

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**Center for Global Development**  
**1800 Massachusetts Ave., NW**  
**Washington, DC 20036**

202.416.4000  
(f) 202.416.4050

**[www.cgdev.org](http://www.cgdev.org)**

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## Summary

This note introduces and illustrates **fCPR** (Forest Conservation Performance Rating), a system of color-coded ratings for tropical forest conservation performance that can be implemented for local areas, countries, regions, and the entire pan-tropics. The ratings reward tropical forest conservation in three dimensions: (1) Exceeding expectations, given an area's forest clearing history and development status; (2) meeting or exceeding global REDD+ goals; and (3) achieving an immediate reduction in forest clearing. We assign Green ratings to areas that meet condition (2); Yellow to areas that meet (1) only; and Red to countries that fail to meet either condition.

We have developed **fCPR** at the Center for Global Development (CGD), using monthly forest clearing indicators from CGD's FORMA (Forest Monitoring for Action). This first release rates the quarterly conservation performance of 27 countries currently tracked by FORMA, as well as 242 of their states and provinces that contain tropical forests. The 27 countries accounted for 94% of tropical forest clearing during the period 2000-2005. Future releases will include additional countries as FORMA begins tracking them.

We also combine the **fCPR** country ratings to produce ratings for major regions and the entire pan-tropics. We find grounds for optimism in the pan-tropical rating, which has been Green in recent quarters. But this is a size-weighted average, which masks great diversity among regions and countries. Latin America has been consistently Green because of Green Brazil's dominance; the Asia/Pacific region has recently been Yellow because Green Indonesia is counterbalanced by Red Malaysia, Cambodia and Papua New Guinea, and Yellow Myanmar; and Africa has been persistently Red because its Red countries have most of the clearing.

While **fCPR**'s current pan-tropical rating is hopeful, many countries remain Red, and many provinces within Green-rated countries are also Red. These provide reminders that tropical forest clearing will not halt without a sustained effort during the coming decade. We hope that the **fCPR** ratings, and FORMA itself, will contribute by monitoring progress toward this goal, and indicating problem areas where focused attention may promote more rapid progress. We will publish frequent updates on CGD's website (<http://www.cgdev.org>) and inform subscribers to our newsletter at [http://www.cgdev.org/section/topics/climate\\_change/newsletter\\_archive](http://www.cgdev.org/section/topics/climate_change/newsletter_archive).

## 1. Why We Developed fCPR

**fCPR (Forest Conservation Performance Rating)**, developed by the authors at the Center for Global Development (CGD), mobilizes the latest forest monitoring technology to produce frequently-updated conservation performance ratings for local areas, countries and regions in the pan-tropics. We have designed **fCPR** to support the mission of REDD+ (Reducing Emissions from Deforestation and Forest Degradation in Developing Countries) in three ways. First, **fCPR** directly promotes conservation by recognizing governments that protect their forested lands. Second, the system aids priority-setting by highlighting areas where forest conservation is lagging. Third, **fCPR** offers the global community an open-source, unbiased, frequently-updated view of global, regional and national progress toward achieving the goals of REDD+. Its ratings reward tropical forest conservation in three dimensions: (1) Exceeding expectations, given an area's forest clearing history and development status; (2) meeting or exceeding global REDD+ goals; and (3) achieving an immediate reduction in forest clearing.

We have developed **fCPR** using monthly forest clearing indicators from CGD's FORMA (Forest Monitoring for Action). Our first release rates the conservation performance of 27 countries currently tracked by FORMA, as well as 242 of their states and provinces that contain tropical forests. The countries included in this first release accounted for 94% of tropical forest clearing during the period 2000-2005.

We also provide summary ratings for the Asia/Pacific region, Latin America, Africa, and the entire pan-tropics. Future releases will include additional countries as FORMA begins tracking them.

## 2. How fCPR Rates Tropical Forest Areas

Rating performance requires benchmarks for judging progress. In REDD+ programs, a common benchmark is forest clearing during a previous period. We begin with a benchmark based on average monthly forest clearing during the first three years of FORMA coverage: 2006-2008.<sup>1</sup> To recognize previous conservation efforts, we raise the benchmark for areas whose deforestation rates during 2000-2005 were lower than the expected rates at their per capita income levels. Our adjustment is proportional to the gap between their actual and expected deforestation rates.

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<sup>1</sup> The first global FORMA report is available at <http://www.cgdev.org/content/publications/detail/1425835>. A technical description of FORMA is available at <http://www.cgdev.org/content/article/detail/1423248/>.

## **2.1 Incorporating the Forest Transition**

Once the initial benchmark is set, we rate progress relative to the normal “forest transition” that accompanies economic development, as conservation values and forest management capability increase. After extensive analysis of the data, we have conservatively set \$15,000 per capita (in purchasing power parity) as the terminal income for tropical forest clearing.<sup>2</sup> Incorporating the forest transition changes a country’s performance benchmark from a fixed value to a target path that declines to zero clearing in the year when per capita income is predicted to reach \$15,000. We base our predictions on countries’ income growth during the past 20 years.

## **2.2 Incorporating REDD+ Goals**

REDD+ reflects the global community’s recognition that we are unlikely to avoid a climate catastrophe unless carbon emissions plummet in the near future. But this may not happen under “business as usual” – the normal forest transition. To incorporate the REDD+ imperative, we introduce a second path that declines from the initial benchmark for each country to zero clearing in a common target year for all countries. No consensus target year has emerged from international negotiations, although drafts circulated at Cancun apparently included references to a target date of 2030. We prefer a more ambitious target, so we set a REDD+ path that declines to zero clearing in 2025.

## **2.3 Rating Conservation Performance**

Once the forest transition and REDD+ paths are established for the 27 countries tracked by FORMA, we assign quarterly performance ratings as illustrated in Figure 1.

We develop the ratings from 12-month moving averages (MA) of FORMA’s monthly clearing indicators, to remove seasonal fluctuations.<sup>3</sup> We further stabilize the series by calculating quarterly averages of the MA. Countries are Green if their quarterly averages are below their REDD+ lines. Green countries are on track to achieve zero clearing by 2025. We assign Yellow to countries whose quarterly averages are between their forest transition and REDD+ lines. Yellow countries are doing better than expected, given their development status, but are not yet on track to zero clearing by 2025. Finally, we assign Red to poor performers: countries whose quarterly averages are above their forest transition and

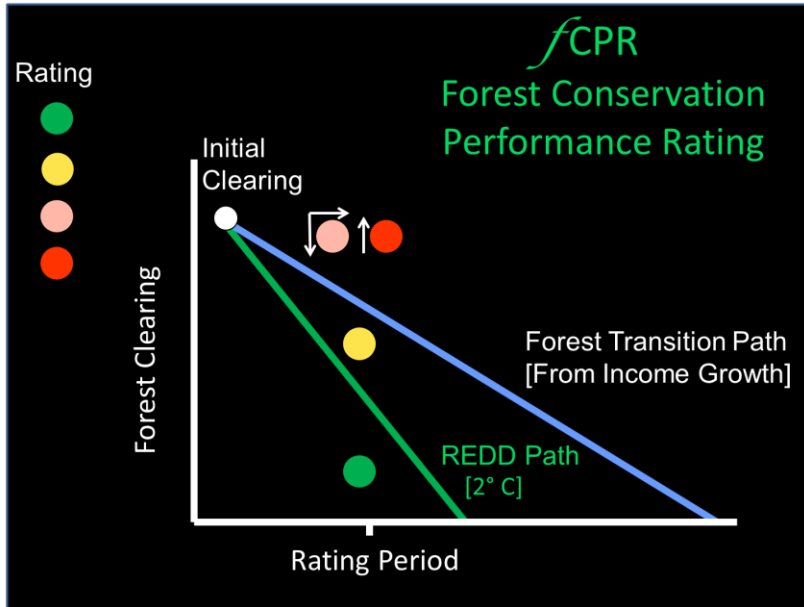
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<sup>2</sup> For a detailed technical description of our approach, see Wheeler, Hammer and Kraft, From REDD to Green: A Global Incentive System to Stop Tropical Forest Clearing, Center for Global Development Working Paper No. 282. We have refined our estimates since publication of that paper.

<sup>3</sup> The moving average for a month is calculated from its clearing indicator and the indicators for the previous 11 months.

REDD+ lines. To recognize incremental progress, we assign light red to countries where clearing is falling or stable, and bright red to countries where clearing is still increasing.

**Figure 1: Assigning Performance Ratings**



FORMA’s monthly database currently spans December, 2005 to August, 2011. Using a three-year period (2006-2008) to set the initial benchmark for each country, we develop twelve quarterly performance ratings for Q4 2008 - Q3 2011.<sup>4</sup>

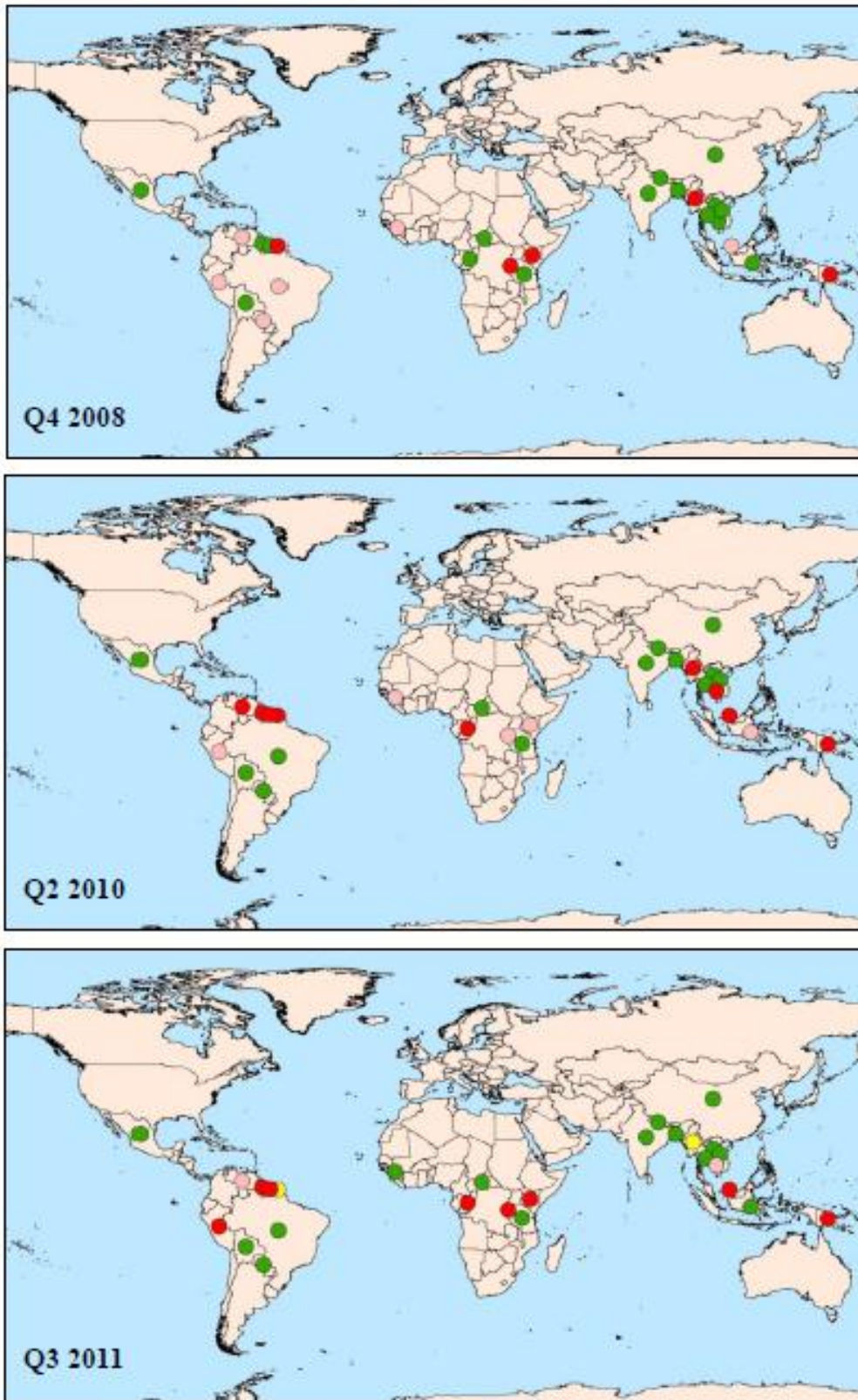
### 3. fCPR Ratings

Table 1 presents ratings for the 27 countries, along with regional and global ratings.<sup>5</sup> To aid interpretation, we include average monthly clearing during the period 2006 - 2011 as a measure of relative scale. We separate the countries by region and sort to highlight countries whose current ratings are Red. Figure 2 maps the ratings for Q4 2008, Q2 2010 and Q3 2011.

<sup>4</sup> We use two months for this rating; it will be extended to three months in the next update. The rating for Q4 2008 is based on the 12-month moving average for December, 2008. We have checked to see whether longer benchmark periods significantly affect country ratings, and they do not: The correlations between scores for 3-, 4- and 5-year benchmark periods are all 94% or higher.

<sup>5</sup> To develop the summary ratings, we assign numerical scores to color codes as follows: Green (4); Yellow (3); light Red (2); dark Red (1). For a regional rating, we calculate each country’s share of total clearing in the region during the rating quarter. Then we weight country scores by these shares; add the share-weighted scores; round the result to the nearest whole number; and assign the color associated with that number. For the global rating, we follow the same procedure with countries’ scores weighted by their shares in total (27-country) clearing during the rating quarter.

Figure 2: Country Performance Ratings



Our global rating in Table 1 provides encouraging news: It has fluctuated between Green and Yellow since Q1 2009, and the most recent quarters have been Green. This indicates that the countries which have dominated tropical forest clearing are currently on track to zero clearing in 2025.

The global Green rating depends heavily on the dominance of clearing in Latin America (rated Green), which in turn depends on the dominance of Brazil (Green). Asia/Pacific is rated Yellow because the Green status of Indonesia, the dominant country in regional clearing, is counterbalanced by the Red status of Papua New Guinea, Malaysia and Cambodia, and the Yellow status of Myanmar.

Africa is rated Red because its Red-rated countries have much more clearing than its Green-rated countries. But average total clearing in Africa (8.99) is tiny compared to clearing in Latin America (1346.88), so Africa's Red rating does not alter the global rating. Similarly, total clearing in Asia/Pacific (731.86) is only 65% of Latin American clearing, so its Yellow status is dominated by Latin America's Green status at the global level.

A strong cautionary note about the global Green rating is obviously warranted, since many countries in Table 1 are not on track to zero clearing in 2025. Table 1 and Figure 2 provide striking pictures of global diversity. In Q3 2011, for example, 10 countries are light or dark Red, 2 are Yellow, and 15 are Green. Similar diversity appears in each region. Long runs of Red ratings characterize many countries in Asia/Pacific (Papua New Guinea, Malaysia, Cambodia, Myanmar); Latin America (Peru, Suriname, Guyana, Venezuela, and French Guiana); and Africa (Burundi, Kenya, Republic of Congo, Guinea). A great deal of work remains if we are to achieve zero clearing by 2025.

Within the 27 countries, Table 2 provides ratings for 242 states and provinces that contain tropical forest areas. Once again we see the magnitude of the task that remains, even for countries rated Green overall. For example, Brazil owes its Green status to the recent Green ratings of several states with large-scale clearing: Minas Gerais, Maranhão, Pará and Rondônia. But ratings have deteriorated from Green to Red in Tocantins, Goiás, Paraíba, and Acre and to Yellow in Amazonas.

Figure 3 puts Brazil in context by displaying state- and province-level ratings for South America in Q4 2008, Q2 2010 and Q3 2011. In a striking contrast, the "Greening" of Brazil and its southern neighbors, Bolivia and Paraguay, is accompanied by the dominance of Red areas to the north and west, in Peru, Venezuela, Guyana, Suriname and French Guiana.<sup>6</sup>

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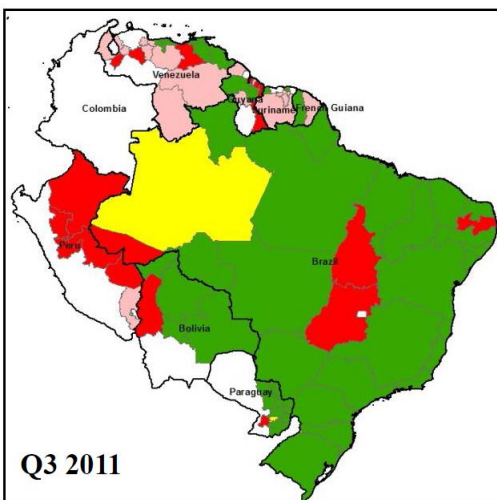
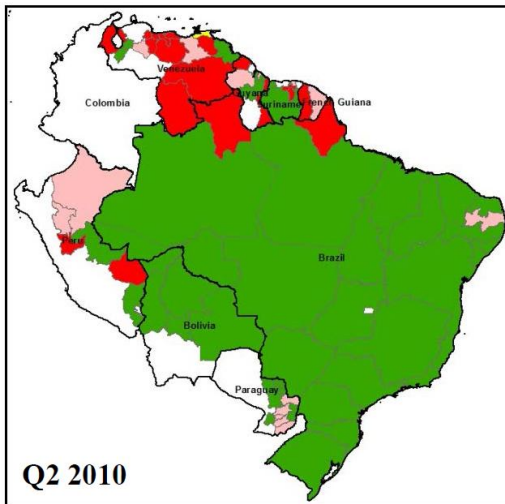
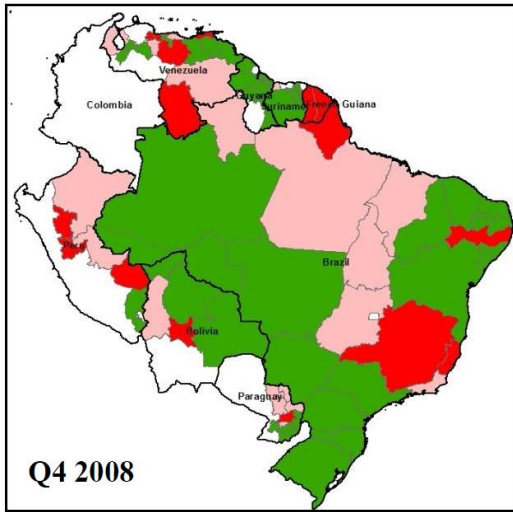
<sup>6</sup> Colombia, Ecuador and the Central American countries will be included in future releases of FORMA and fCPR. Uncolored areas in currently-tracked countries are provinces that have no uncleared tropical forest land in the GIS databases available to us.



Table 1: Country Performance Ratings, Q4 2008 - Q3 2011

Region/Country	Average Clearing	2008				2009				2010				2011	
		Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3		
GLOBAL	2087.73	Red	Green	Green	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Green	Green	Green		
ASIA/PACIFIC	731.86	Yellow	Yellow	Yellow	Yellow	Red	Red	Red	Red	Yellow	Yellow	Yellow	Yellow		
Papua New Guinea	8.89	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red		
Malaysia	231.83	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red		
Cambodia	11.04	Green	Green	Yellow	Green	Yellow	Yellow	Red	Red	Red	Red	Red	Red		
Myanmar	77.86	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Yellow		
Indonesia	385.76	Green	Green	Green	Green	Yellow	Red	Red	Yellow	Green	Green	Green	Green		
Bangladesh	0.02	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green		
China	4.02	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green		
India	0.81	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green		
Laos	9.88	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green		
Nepal	0.06	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green		
Thailand	0.8	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green		
Vietnam	0.88	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green		
LATIN AMERICA	1346.88	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green		
Peru	17.24	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red		
Suriname	0.63	Green	Green	Green	Red	Red	Red	Red	Red	Red	Red	Red	Red		
Guyana	0.65	Green	Green	Green	Red	Red	Red	Red	Red	Red	Red	Red	Red		
Venezuela	24.67	Red	Red	Red	Green	Green	Red	Red	Red	Red	Red	Red	Red		
French Guiana	2.33	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Yellow		
Paraguay	75.8	Red	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green		
Brazil	1207.92	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green		
Bolivia	14.75	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green		
Mexico	2.88	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green		
AFRICA	8.99	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red		
Burundi	1.84	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red		
Kenya	2.51	Red	Red	Red	Red	Red	Red	Red	Red	Red	Green	Green	Red		
Republic Of Congo	3.29	Green	Green	Green	Green	Green	Red	Red	Red	Red	Red	Red	Red		
Guinea	1.23	Red	Red	Red	Red	Red	Red	Red	Yellow	Red	Green	Green	Green		
Central African Republ	0.05	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green		
Tanzania	0.06	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green		

Figure 3: Provincial Performance Ratings, South America



Indonesia displays a highly-varied pattern in Table 2. Some provinces with large-scale clearing have consistent Green ratings on the islands of Sumatra (Riau, Sumatera Selatan) and Borneo (Kalimantan Tengah). Some have moved from Red to Green (principally Jambi, Sumatera Barat and Lampung on Sumatra), while others have moved from Green to Red (most notably Kalimantan Timur on Borneo). And some are persistently Red (particularly Aceh and Sumatera Utara on Sumatra, and Kalimantan Barat on Borneo). Another striking pattern is the Red status of three provinces on the island of Sulawesi (Sulawesi Selatan, Sulawesi Barat and Sulawesi Tengah).

Figure 4 displays ratings for the provinces of Indonesia and other Southeast Asian countries in Q4 2008, Q2 2010 and Q3 2011. Three patterns are evident:

(1) General deterioration of ratings from Q4 2008 to Q2 2010 in mainland Southeast Asian countries, particularly peninsular Malaysia and Myanmar, followed by improvement to Q3 2011; (2) Steady improvement in Indonesian Sumatra, from numerous dark Red ratings in Q4 2008 to none in Q3 2011; (3) Marked deterioration from Q4 2008 ratings in the eastern and northern areas of Borneo (both Malaysian and Indonesian).

#### **4. Conclusion**

In this note we have introduced **fCPR** (Forest Conservation Performance Rating), which color-codes performance in 27 pan-tropical countries and 242 of their states and provinces. We assign Green ratings to countries, states and provinces that are on track to zero tropical forest clearing in 2025; Yellow when their progress is better than expected, given their development status, but insufficient to achieve the 2025 target; and Red when their performance is worse than expected.

We find grounds for optimism in our composite rating for the pan-tropics, which has been Green in recent quarters. But this is a size-weighted average, which masks great diversity among regions and countries. Latin America is rated Green because of Green Brazil's dominance; the Asia/Pacific region is Yellow because Green Indonesia is counterbalanced by Red Malaysia, Cambodia and Papua New Guinea, and Yellow Myanmar; and Africa is Red because its Red countries have most of the overall clearing.

Many countries remain Red, and many provinces in Green countries are also Red. These ratings are reminders that tropical forest clearing will not halt without a sustained effort during the coming decade. We hope that the **fCPR** ratings, and FORMA itself, will contribute to monitoring progress toward this goal, and indicating problem areas where focused attention may promote more rapid progress. We will publish frequent updates on CGD's website and inform our newsletter subscribers at [http://www.cgdev.org/section/topics/climate\\_change/newsletter\\_archive](http://www.cgdev.org/section/topics/climate_change/newsletter_archive).

Figure 4: Provincial Performance Ratings, Southeast Asia

