CORRESPONDENCE

The Rights and Wrongs of Brazil's Forest Monitoring Systems

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The article "Are Brazil's Deforesters Avoiding Detection?" published recently in Conservation Letters offers a detailed analysis of the limits of PRODES, Brazil's best known system for monitoring deforestation in the Amazon rainforest. While the article provides a useful comparison of PRODES and two other monitoring systems, we strongly disagree with the authors' suggestion that Brazil's monitoring systems are "antiquated and incomplete" and that they do not provide the basis for "transparently achieving Brazil's GHG (greenhouse gases) mitigation commitments" (Richards et al. 2016: 11). Richard's et al. ignore the existence of other monitoring systems developed by the Brazilian government over the last decade. Thus, while PRODES still have a central role, the government has also at its disposal DETER to detect in near real-time large plots of forest degradation, DETEX for selective logging, DEGRAD for forest degradation, DETER-B for small plots of forest degradation and TerraClass for the monitoring of the increase and loss of secondary forests and other land uses (see Table 1 for a full list; Diniz et al. 2015; Almeida et al. 2016).

Richards et al. are also incorrect in suggesting that Brazil accounts only for the GHG from clear-cut deforestation detected by PRODES. Since the release of its First National Communication to the United Nations Framework Convention on Climate Change (UNFCCC) in 2004, the country has improved substantially the accounting methodology for the land-use sector. Thus, in the last communication released in April 2016 Brazil provided a detailed matrix of land use changes from 1994–2002, 2002–2005 and 2005–2010 for the Amazon biome, and 1994–2002 and 2002–2010 for the other biomes. In this way, the government accounted for the emissions from not only clear-cut deforestation (as in PRODES) but also from forest degradation, the conversion of secondary forests and the incidence of fire. As a result of this and other methodological refinements the total emissions for the year 2005 increased by 30% in relation to the previous estimate.

Nonetheless Brazil has substantial room for improvement in aspects that have not been mentioned by Richards et al. Since 2003, the country has reached an outstanding level transparency with the regular publication of deforestation data on the internet and was cited as the "envy of the world" in relation to the monitoring of the Amazon (Kintisch 2007: 536; Rajão and Georgiadou

Table 1 Main forest monitoring systems developed by the Brazilian government

Name	Creation year	Area covered	Frequency	Main satellites	Minimum unity of mapping (ha)*	Image resolution (m)	Types of land-use detected
PRODES	1988	Amazon biome	Yearly	Landsat, ResourceSat, CBERS	6.25	20–30	Clear-cut
DETER	2004	Amazon biome	Daily/Montly	Terra	25	250	Clear-cut and degradation
DEGRAD	2007	Amazon biome	Yearly (last in 2014)	Landsat, CBERS , ResourceSat	6.25	20–30	Degradation
TerraClass Amazônia	2008	Amazon biome	Biennial	Landsat, Terra, ResourceSat and CBERS	6.25	20–250	Clear-cut of primary and secondary forests
DETEX	2009	Amazon biome	NA	Landsat, CBERS, ResourceSat	6.25	20–30	Selective logging
TerraClass Cerrado	2013	Cerrado biome	Biennial	Terra, CBERS, ResourceSat Landsat	6.25	20–250	Clear-cut of primary and secondary forests
DETER B	2015	Amazon biome	Daily/Monthly	CBERS, ResourceSat	3	56–64	Clear-cut, degradation, fire, selective logging
Third National Communication to the UNFCCC	2016	Brazil	Every five years	Landsat, ResourceSat	6	24–30	Clear-cut, degradation, selective logging and fire

*In order to avoid false positives only new clearings above this size are considered, but all observable increases in existing clearings are accounted for.

2014). More recently, however, these achievements have been threatened by instances of political interference. For example, during the 2014 presidential elections the government delayed the release of DETER's data showing a deforestation hike under the unconvincing argument that deforesters were using the data to outsmart law enforcement. The lack of recent official deforestation data for all biomes (the last official data for the cerrado is from 2011) and the impossibility of tracking deforestation in supply chains using the data publicly available from the rural environmental registry (CAR) are also problematic (Moutinho *et al.* 2016). Yet, if Brazil is able to further improve its forest monitoring systems and better protect them against political interference, the country will reaffirm its global leadership in delivering GHG reductions in a transparent and independently verifiable manner.

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