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SUMMARY

SAD detected 185 square kilometers of deforestation in the Legal Amazon in August 2013. That represented a 20% reduction in relation to August 2012 when deforestation totaled 232 square kilometers. Among the states, deforestation occurred mainly in Pará (41%) and Amazonas (28%)

Degraded forests in the Legal Amazon totaled 92 square kilometers in August 2013. In relation to August 2012, when forest degradation totaled 60 square kilometers, there was an increase of 53%.

It was possible to monitor 80% of the forest area in the Legal Amazon, where as in August 2012 there were fewer clouds and it was possible to monitor 84% of the territory.

Deforestation Statistics

According to SAD, deforestation (total suppression of the forest for other alternative land uses) reached 185 square kilometers in August 2013 (Figure 1 and Figure 2).

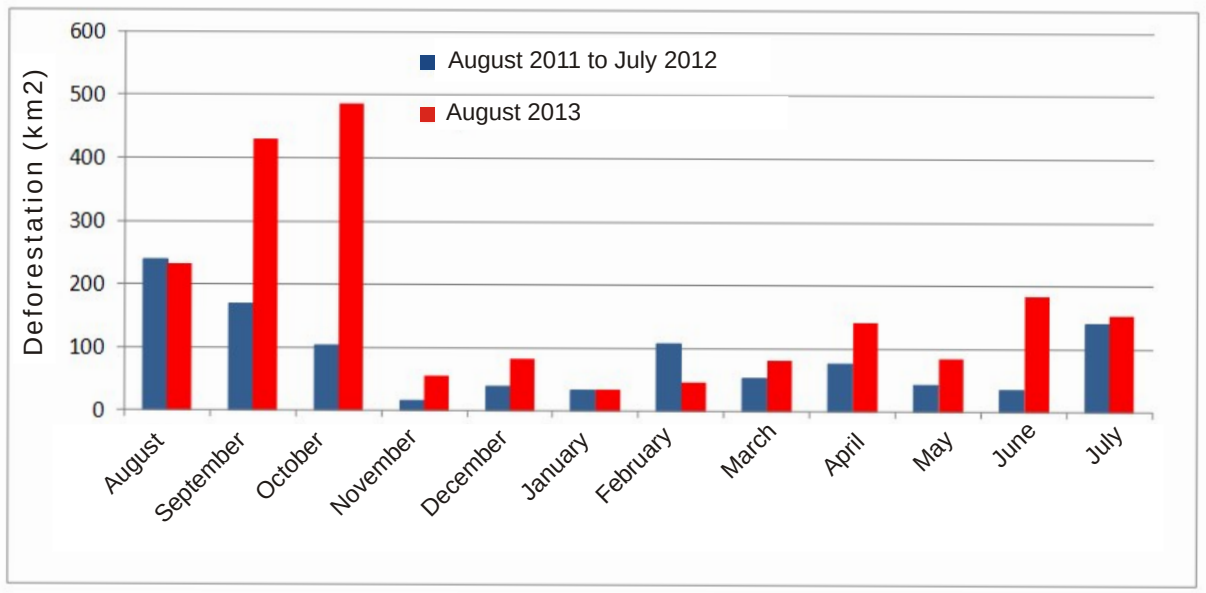

Figure 1. Deforestation from August 2012 to August 2013 in the Legal Amazon (Source: Imazon/SAD).

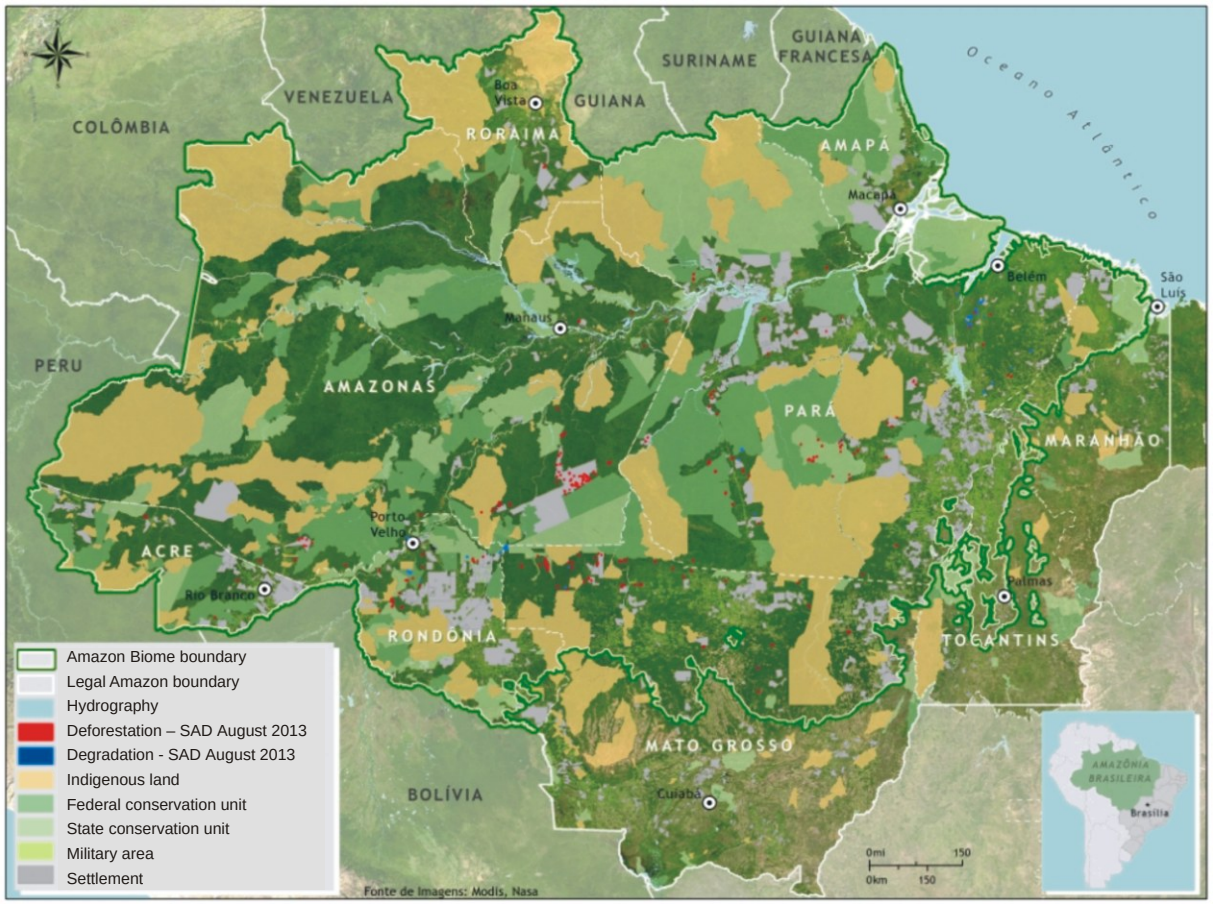

Figure 2. Deforestation and Forest Degradation in August 2013 in the Legal Amazon (Source: Imazon/ SAD).

In August 2013, deforestation occurred in Pará(41%), Amazonas (28%), Rondônia (23%), Acre (6%), and Mato Grosso (3%). There was an increase in deforestation in relation to August 2012 in Acre (+881%), Amazonas (+36%) and Rondônia (+23%). On the other hand, there was a reduction of deforestationin Pará (-35%) and Mato Grosso (-35%).

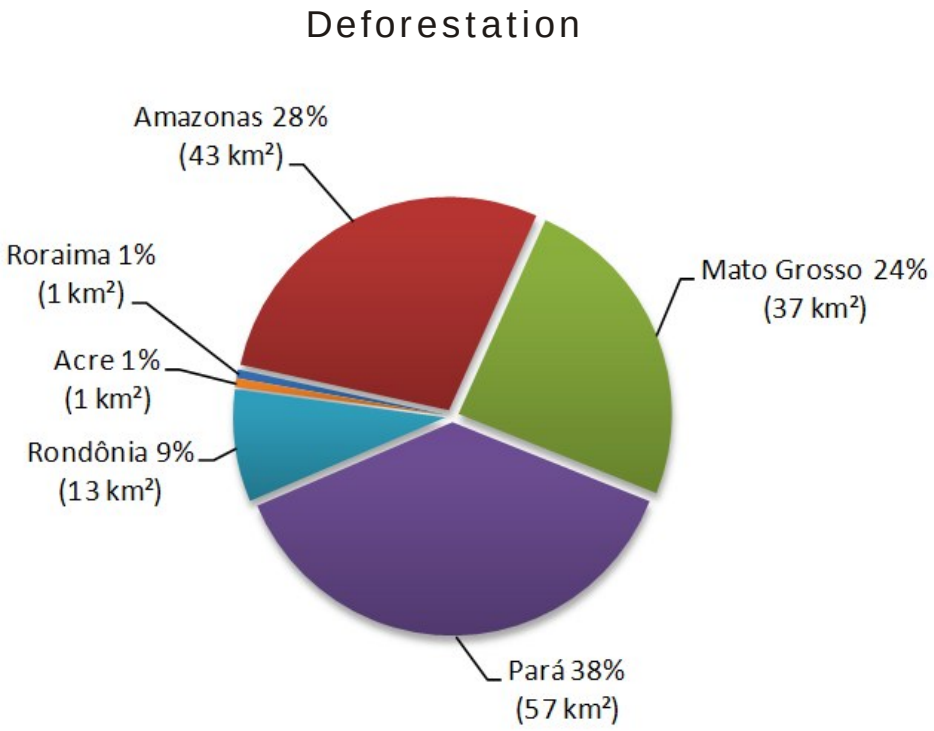

Figure 3. Percentage of deforestation in the States of the Legal Amazon Legal in August 2013 (Source: Imazon/SAD).

Table 1. Evolution of deforestation among States in the Legal Amazon from August 2012 to August 2013 (Source: Imazon/SAD).

State	August2012	August2013	Variation (%)
Pará	116	75	-35
Mato Grosso	43	6	-86
Rondônia	34	42	+23
Amazonas	38	51	+36
Roraima	-	1	-
Acre	1	10	+881
Tocantins	-	-	-
Amapá	-	-	-
Total	**232**	**185**	**-20**

* Data from the State of Maranhão has not been analyzed.

Forest Degradation

In August 2013, SAD recorded 92 square kilometers of degraded forests (forests intensely exploited by logging and/or burned) (Figures 2 and 4). Of that total, the majority (52%) occurred in Mato Grosso followed by (47%).

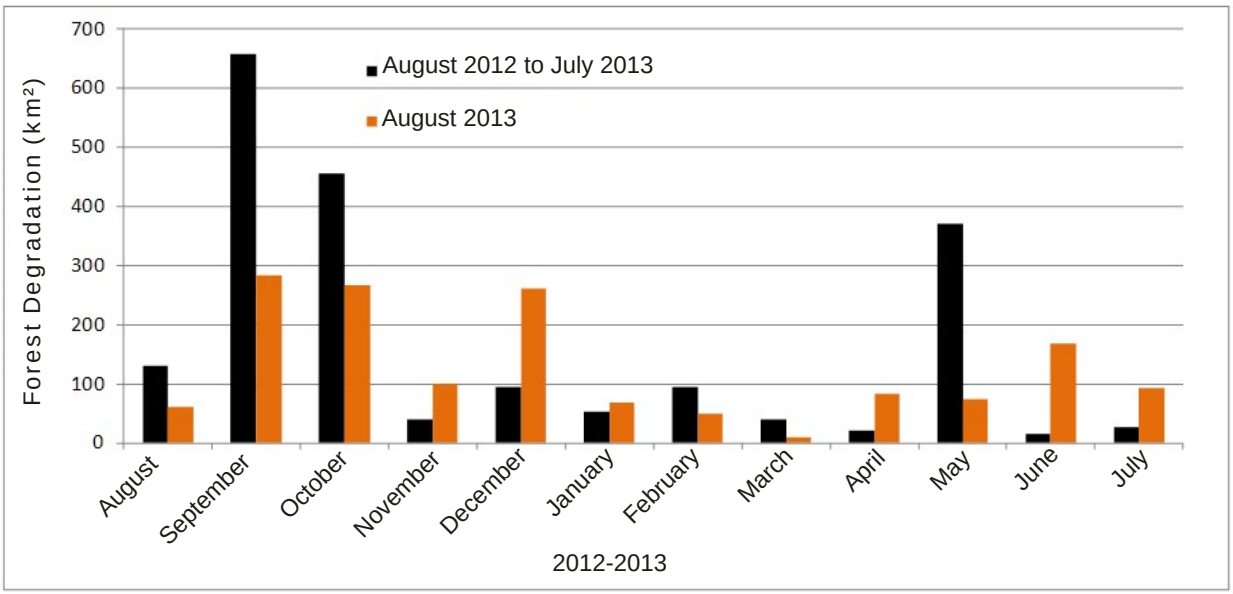

Figure 4. Forest Degradation from August 2012 to August 2013 in the Legal Amazon (Source: Imazon/SAD).

Table 2. . Evolution of forest degradation among the States in the Legal Amazon in August 2012 and August 2013 (Source: Imazon/SAD).

State	August 2012	August 2013	Variation (%)
Mato Grosso	21	48	+126
Pará	32	43	+34
Rondônia	5	-	-97
Amazonas	2	1	-63
Roraima	-	-	-44
Acre	-	-	-
Tocantins	-	-	-
Amapá	-	-	-
Total	**60**	**92**	**+53**

***** Data from the state of Maranhão was not analyzed.

Deforestation Geography

In August 2013, the great majority (58%) of deforestation occurred in areas that were private or under different stages of possession. The remaining deforestation was recorded in Land Reform Settlements (20%), Conservation Units (21%) and Indigenous Lands (1%) (Table 3).

Table 3. Deforestation by land category in August 2013 in the Legal Amazon (Source: Imazon/SAD).

Category	August 2013	
	km²	%
Land Reform Settlement	37	20
Conservation Units	39	21
Indigenous Lands	1	1
Private, Possession & Untitled public lands	108	58
Total (km²)	185	100

Reform Settlements

SAD recorded 30 square kilometers of deforestation in Land Reform Settlements in August 2013 (Figure5). The Settlements most affected by deforestation were PA Monte (Boca do Acre, Amazonas), PA Rio Juma (Apui, Amazonas) and PA Acari (Novo Aripuanã, Amazonas).

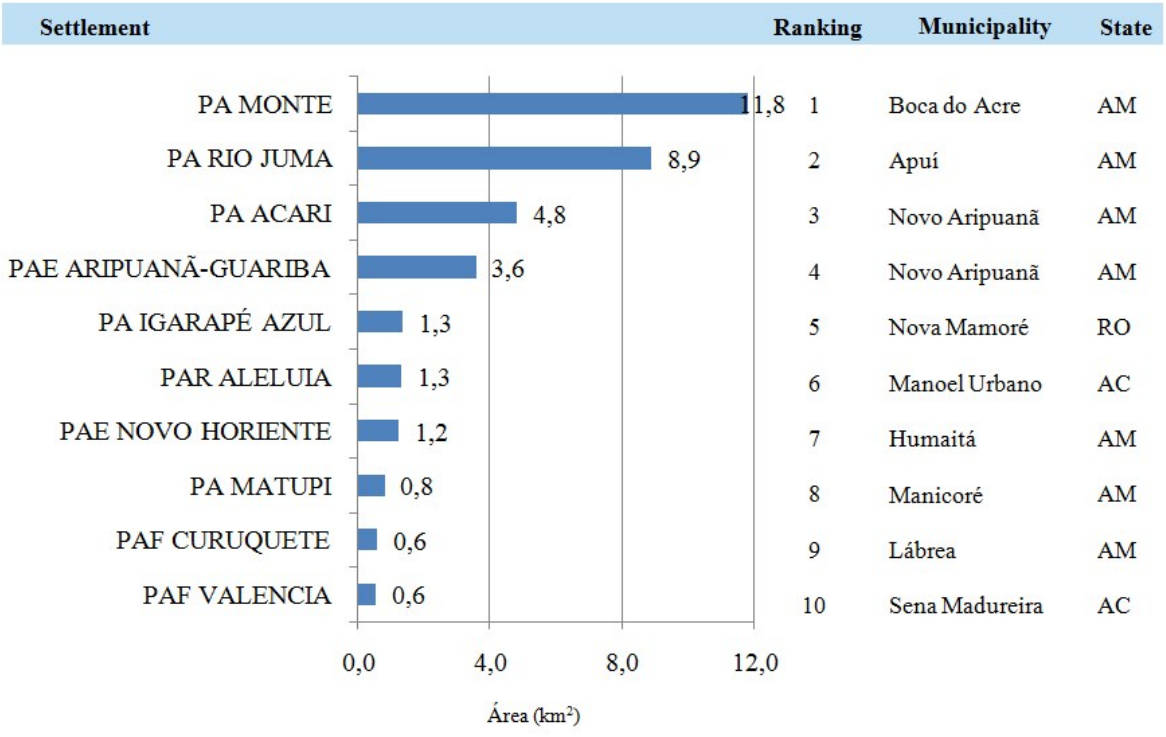

Figure 5. Land Reform Settlements deforested in August 2013 in the Legal Amazon (Source: Imazon/SAD).

Protected Areas

In the month of August 2013, SAD detected 37 square kilometers of deforestation in the Conservation Units of Flona do Jamanxim (Pará), Resex Jaci Paraná (Rondônia), Florex Rio Preto-Jacundá (Rondônia), APA Triunfo do Xingu (Pará), APA Rio Pardo (Rondônia), PES de Guajará-Mirim (Rondônia), Flona de Tefé (Amazonas), Parna Mapinguari (Amazonas) and Flota do Antimary (Figure 6). In the case of Indigenous Lands, in August 2013 1 square kilometer of deforestation was detected in the Karipuna Land, located in the State of Rondônia.

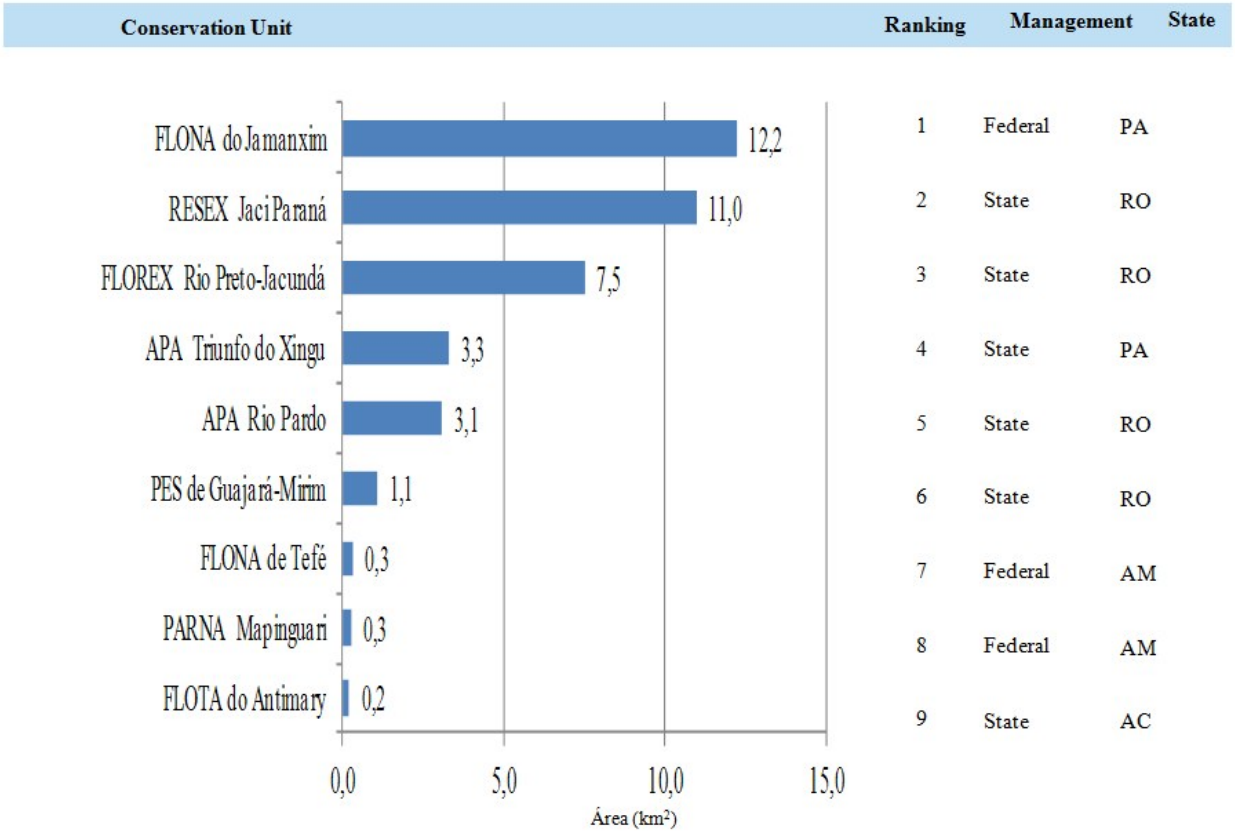

Figure 6. Conservation Units deforested in the Legal Amazon in August 2013 (Source: Imazon /SAD).

Municipalities Critics

In August 2013, the most deforested municipalities were: Altamira (Pará) and Novo Progresso (Figure7 and 8).

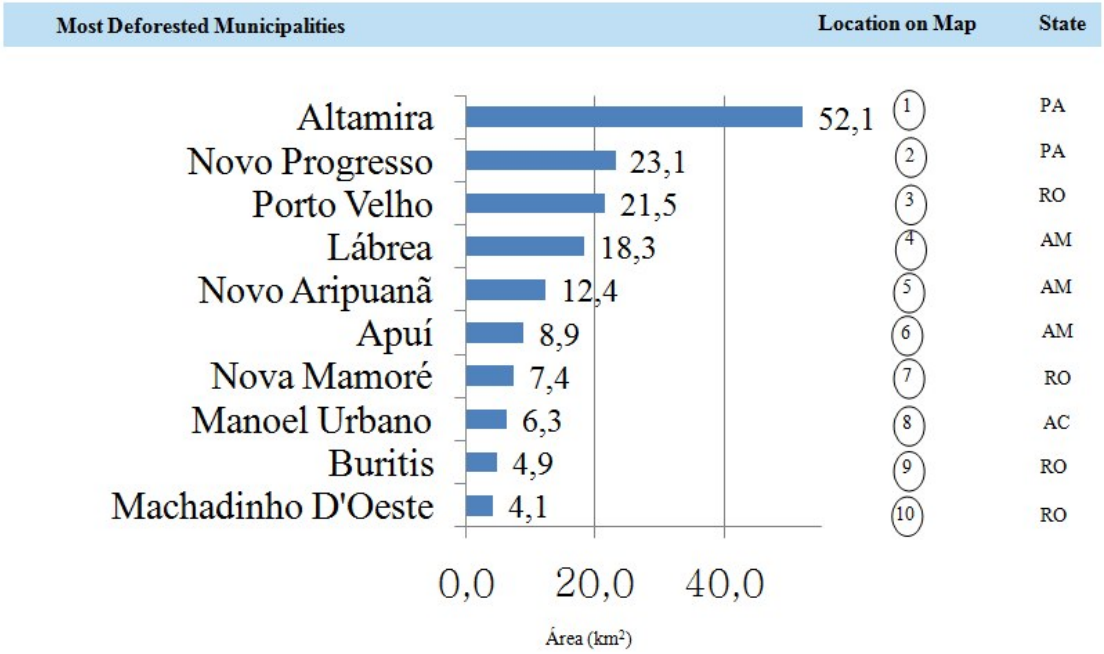

Figure 7. Municipalities with the most deforestation in the Legal Amazon in August 2013 (Source: Imazon /SAD).

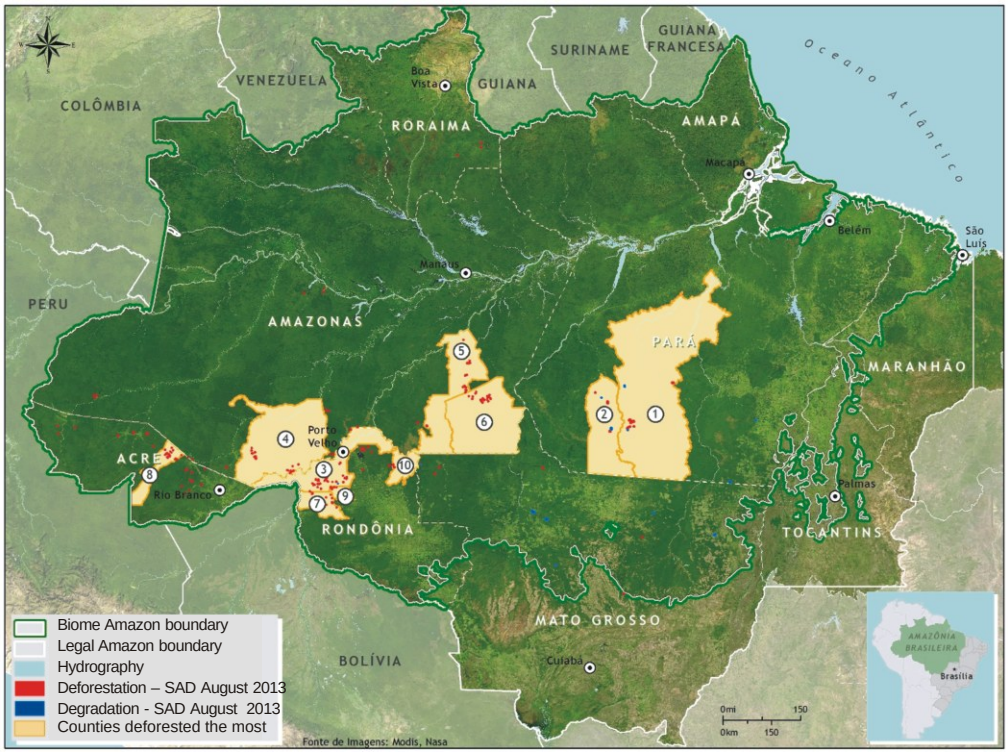

Figure 8. Municipalities with the largest areas deforested in August 2013 (Source: Imazon/SAD).

Coverage by clouds and Shade

In August 2013, it was possible with SAD to monitor 80% of the forest area in the Legal Amazon. The other 8% of forest territory were covered by clouds, which made it difficult to detect deforestation and forest degradation.

The States with the highest cloud cover were Amapá (81%), Pará (40%) and Roraima (30%). Because of that, the data on deforestation and forest degradation for August 2013 may be underestimated (Figure9).

* Data related to the state of Maranhão, that integrates Legal Amazon, was not analyzed.

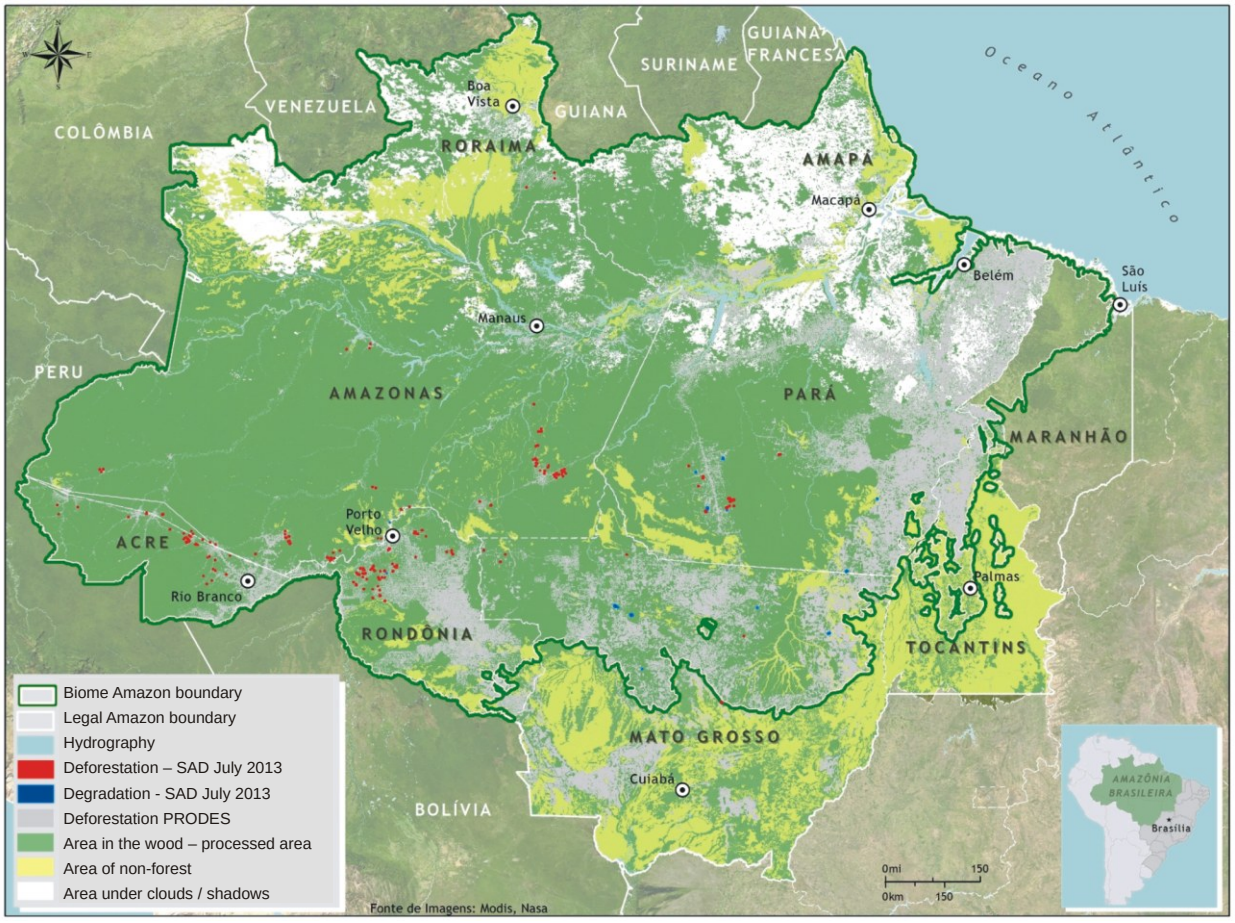

Figure 9. Area with cloud and shade in July 2013 in the Legal Amazon.

Google SAD-EE

Since June 2012 the detection of alerts of deforestation and forest degradation has been carried out in the Google's Earth Engine – EE – platform, with the new version: SAD EE. This system was developed in collaboration with Google and uses the same process already used by SAD, with MODIS' reflectance images, in order to generate alerts of deforestation and forest degradation.

Table I: SAD 3.0

Since August 2009, SAD has been introducing some news. First, we created a graphical interface to integrate all image processing programs used in SAD. Second, we started computing deforestation in areas that were covered by clouds in the previous months, under a new class. Finally, deforestation and degradation are detected with pairs of NDFI images in a change detection algorithm. The main method remains the same as SAD 2, as described here below.

SAD generates a temporal mosaic of daily MODIS images of MOD09GQ and MOD09GA products to filter the clouds. Afterwards, we used a technique of different spectral resolution band merge, i.e., pixels of different sizes. In that case, we changed the 500 meter 5-band scale of MODIS to 250 meters. This allowed to enhance the spectral model of pixel mixture, thus supplying ability to estimate the abundance of vegetation, soils and non-active photo-synthetically vegetation (NPV, for Non-Photosynthetic, in English) components (vegetation, soil and Shadow) so to be able to calculate the NDFI with the following equation:

$$NDFI = \frac{(VGs - (NPV + Soil)}{(VGs + NPV + Soil)}$$

Where VG is the standardized component of vegetation for shadow given by:

$$VGs = Vegetation / (1 - Shadow)$$

NDFI ranges from -1 (pixel with 100% of exposed soil) to 1 (pixel with >90% with forest vegetation). Thus, we could have a continuous image showing the transition from deforested areas, crossing the degraded forests, reaching the forest with no warning signs of disturbance.

Detection of both deforestation and degradation was shown this month with the difference of NDFI images related to the consecutive months. Hence, a reduction in NDFI values ranging from -200 to -50 indicates possibly cleared areas, and a reduction ranging from -49 to -20 indicates signs of degradation.

SAD 3.0 Beta is compatible with the previous versions (SAD 1.0 and 2.0), because the detection threshold of deforestation was calibrated so to generate the same type of response obtained by the former method.

SAD is already operating in the State of Mato Grosso since August 2006 and in the Amazon since April 2008. In this report, we present the monthly data generated by the SAD from August 2006 to August 2013.

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Data Source:
The deforestation statistics are generated using data from the SAD (Imazon);
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http://www.obt.inpe.br/prodes/

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