



SOY MORATORIUM

MONITORING SOY CROPS IN THE AMAZON BIOME
USING SATELLITE IMAGES

2017/2018 CROP

EXECUTIVE SUMMARY

Created in 2006, the Soy Moratorium completed twelve years of existence in this crop year of 2017/18 and continues to be an internationally recognised initiative as being very relevant in the fight against deforestation associated with soy production in the Amazon Biome^{1,2}. This recognition comes from its proven efficacy in reconciling agricultural production with environmental preservation. During the Moratorium's twelve years, the soy area in the Amazon Biome has increased over fourfold, going from 1.14 million hectares in the crop year 2006/07 to 4.66 million hectares in crop year 2017/18. This represents 13.3% of Brazil's soy planted area (35.1 million hectares). This report shows that only a residual soy planted area was found in deforestations that occurred during the period of the Soy Moratorium^{3,4}.

Deforestation and the possible conversion of forest cover into soy crops that are not in accordance with the Soy Moratorium are identified through strict monitoring using satellite images. The Moratorium was implemented on 24 July 2006 but, after approval of the Forest Code⁵, the reference date was changed to 22 July 2008. The GTS (Soy Task Force), formed by the member companies of ABIOVE and ANEC, by civil society organisations, the Ministry of the Environment and the Bank of Brasil, is responsible for the Moratorium's governance and operations.

The Amazon Biome has some characteristics that favour the success of the Soy Moratorium, especially the considerable stock of land that was cleared in the Amazon before the Moratorium's reference date, making expansion into areas that were cleared in the past a possibility. A large part of this expansion has occurred in areas previously occupied by pastures. It should be noted that the development of livestock activities is also subject to environmental restrictions, and that this sector is seeking alternatives to intensify land use to compensate for the pastures lost to soy crops.

In the Amazon Biome, 98% of the soy area is in the 95 municipalities that make up the study area for crop year 2017/18, located in seven states: Mato Grosso, Pará, Rondônia, Roraima, Amapá, Maranhão and Tocantins. Based on the annual analyses made by INPE's PRODES⁶ program, deforestation in the Amazon Biome was 5.3 million hectares between the period of 22 July 2008 (the new Soy Moratorium reference date) and the PRODES evaluation of 2017. Of this total, about 1.39 million hectares occurred in those 95 municipalities, corresponding to 26% of the deforestation observed in the Biome during the Moratorium. However, soy plantations that do not comply with the Moratorium were identified on just 64,316 hectares of the deforestations mapped by PRODES from 2009 to 2017.

This non-compliant area corresponds to 1.4% of soy's total cultivated area in the Amazon Biome in crop year 2017/18 and to 4.6% of the total deforested area – for various land uses – during the Soy Moratorium in the 95 monitored municipalities. In other words, 95.4% of the deforestations occurred during the Moratorium is not associated with the conversion of forest to soy considering only the area evaluated by the Moratorium. It should be noted that just seven municipalities (7%) concentrate 52% of the soy that does not comply with the Moratorium.

This report describes the methodology used and shows the results related to soy monitoring in the Amazon Biome for the 2017/18 crop year, in the context of the Soy Moratorium. The Appendix has the detailed information available on the deforested polygons with soy crops that do not comply with the Moratorium.

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INTRODUCTION

The Soy Moratorium is a commitment undertaken by the productive sector to produce deforestation-free soy in the Amazon Biome, promoting the environmental sustainability of the Soy Chain on the domestic and international markets. The 2012 Brazilian Forest Code holds the producer responsible for a considerable portion of the native vegetation on rural properties, and the Soy Moratorium reinforces Brazil's environmental legislation to prioritise soy crops in areas deforested before the Soy Moratorium, thus eliminating new deforestation in the Biome.

The Soy Moratorium was declared on 24 July 2006 but, with the new Forest Code⁵ sanctioned on 25 May 2012, the Moratorium's reference date became 22 July 2008, starting with the 2012/13 crop year. Over the twelve years of the Moratorium's existence, procedures for monitoring soy in deforested areas have gradually improved through the incorporation of technological advances in the period, with emphasis on soy mapping through remote sensing satellite images in the Amazon Biome⁴ that provide a better choice of its soy-producing municipalities.

Monitoring in the context of the Soy Moratorium uses a vast set of remote sensing satellite images obtained by sensors with complementary spatial and temporal resolutions that are carefully analysed by an experienced team of interpreters. As the Moratorium is restricted to private rural properties, the analyses made during the monitoring were complemented by the database for deforestation in the Amazon Biome during the Moratorium, made available by PRODES⁶, as well as the data bases of the following institutions: Agrosatélite⁴, FUNAI⁷, Ministry of the Environment⁸, IBGE⁹ and INCRA¹⁰.

2

SCOPE OF THE WORK

The scope of this work is to identify the occurrence of soy crops in the 2017/18 crop year, in areas of the Amazon Biome that were deforested after 22 July 2008.

The specific objective is to use remote sensing satellite images to map soy crops in the 2017/18 crop year that were identified in deforested areas after 22 July 2008 (PRODES 2009-2017), in private rural properties outside of settlements, but within municipalities with at least 5,000 hectares of soy in the Amazon Biome.

3

METHODOLOGY

In the first stage of the work, municipalities with a soy area equal to or larger than 5,000 hectares in the Amazon Biome were selected, taking as base the Agrosatélite⁴ mapping of these areas in the 2016/17 crop year. Next, all the deforested polygons mapped by PRODES (2009-2017) in these municipalities were selected. Finally, the soy crops in these deforested areas were identified and mapped through remote sensing satellite images. The detailed methodology follows.

3.1 Definition of the study area

The first stage in defining the study area was to update the list of municipalities selected in the prior year with a soy area equal to or larger than 5,000 hectares in the Amazon Biome. This was done based on the Amazon Biome soy areas mapped by Agrosatélite for the 2016/17 crop year⁴. With this update, Nova Olímpia/Mato Grosso was removed from the list and Novo Progresso/Pará, Altamira/Pará, Redenção/Pará, Santa Fé do Araguaia/Tocantins, Piraquê/Tocantins, Cujubim/Rondônia and Alto Paraíso/Rondônia were added, forming a list of 95 municipalities with over 5,000 hectares representing 98% of the soy production in the Amazon Biome. The remaining 2% was distributed in another 77 municipalities. Of the selected 95 municipalities, 58 are in Mato Grosso state, 16 in Pará state, ten in Rondônia state, three in Roraima state, two in Amapá state, three in Maranhão state and three in Tocantins state.






The second stage in defining the study area consisted of the selection of the polygons mapped by PRODES⁶, and this was done based on the following criteria:

1	2	3	4
The polygon was wholly or partially within the Amazon Biome (source IBGE ⁹).	It was wholly or partially within at least one of the 95 municipalities identified as having over 5,000 hectares planted with soy ⁵ .	It was located in a private rural property and outside of indigenous lands ⁷ , Conservation Units ⁸ and settlements ¹⁰ , and	It has an area of over 25 hectares after the aggregation of adjacent polygons (Item 3.3).

Figure 1 shows the geographical distribution of the 95 selected soy-producing municipalities, in addition to the Conservation Units, indigenous lands and settlements used to define the range of the study area in accordance with the criteria listed above.

- MT – 58 municipalities
- PA – 16 municipalities
- RO – 10 municipalities
- RR – 3 municipalities
- AP – 2 municipalities
- MA – 3 municipalities
- TO – 3 municipalities

Legenda

-  Amazon Biome boundary
-  State boundary
-  Selected municipal boundary
-  Monitored area
-  Settlements
-  Indigenous lands
-  Conservation Units

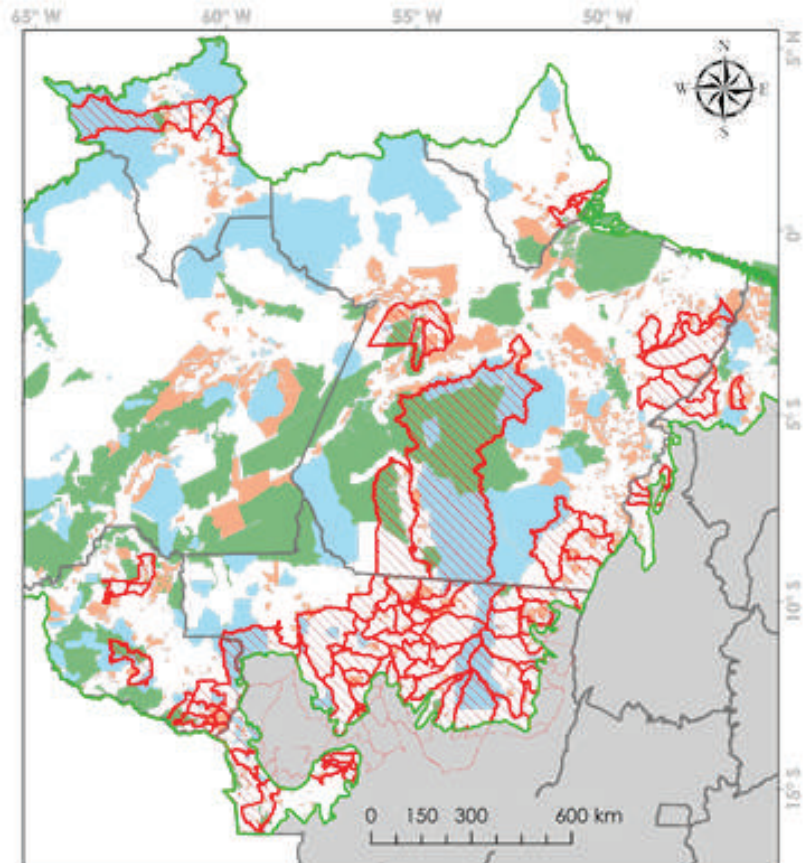


Figure 1. Monitored area of the 95 selected municipalities

It should be noted that, in the case of municipalities partially located within the Amazon Biome, the analysis of the data was restricted to that part of the polygon lying within the Biome.

3.2 Deforestation mapped by PRODES

Since 1988, PRODES⁶, developed and executed by INPE, has mapped deforested areas and calculated the annual rates of deforestation in the Amazon Biome. The data on deforestation is available on the internet through a georeferenced database, which includes the boundaries of the deforested areas (polygons) and information on the year each polygon was deforested.

Figure 2 shows the Legal Amazon deforestation rates calculated by PRODES, highlighting the period before and after implementation of the Soy Moratorium. As can be seen, there has been a significant fall in the deforestation rates of Legal Amazon due to government intervention suppressing illegal deforestation in that region through the PPCDAm Plan¹¹, created in 2004. The fall in deforestation rates reached its minimum level in 2012 and, since then, has shown a tendency for gradual growth. In 2017, there was a small fall in the deforestation rate compared with the previous year but it was still above the average of the last nine years.

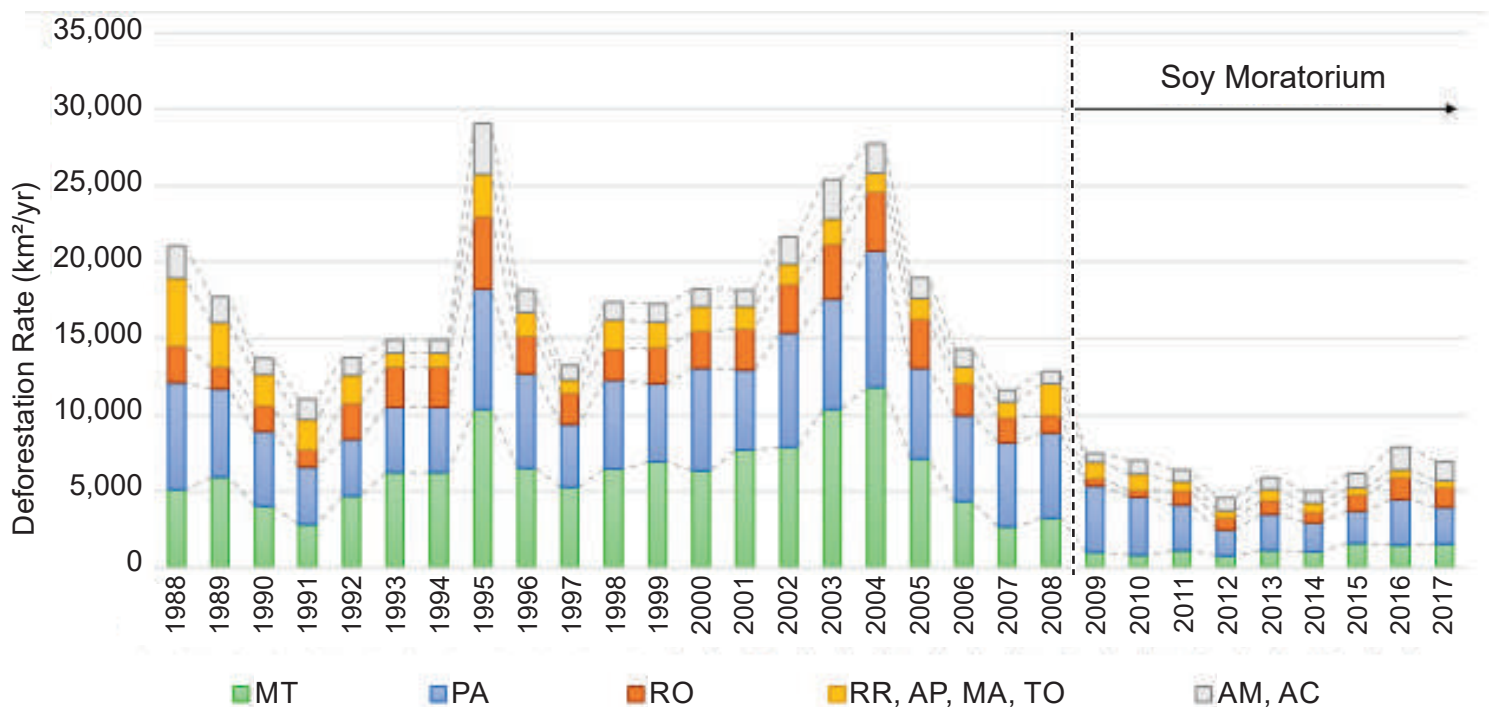


Figura 2. Taxas de desflorestamento calculadas pelo PRODES para a Amazônia Legal, com destaque para os anos anteriores e posteriores à Moratória da Soja.

Source: Adapted from PRODES⁶.

Table 1 shows the data supplied by the PRODES mapping during the period of the Soy Moratorium for the states of Mato Grosso, Pará, Rondônia, Roraima, Amapá, Maranhão and Tocantins. These values refer to deforestation in the Amazon Biome, not including the portion of the Cerrado and Pantanal Biomes that are part of Legal Amazon. The average deforestation rate in the 2009-2017 period was 492,115 hectares/year (4,921 km²/yr).

Table 1. Total annual deforestation in the Amazon Biome during the Soy Moratorium, in the states of Mato Grosso (MT), Pará (PA), Rondônia (RO), Roraima (RR), Amapá (AP), Maranhão (MA) and Tocantins (TO), in hectares

Year of PRODES Mapping during the Soy Moratorium ^{I, II, III, IV}										
State	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
MT	71,841	71,664	94,321	70,983	102,352	101,914	150,497	136,050	127,965	927,587
PA	355,732	341,788	255,202	172,610	213,457	182,990	288,568	284,444	260,218	2,355,009
RO	42,479	44,803	77,299	69,617	96,915	76,822	108,552	122,045	128,743	767,274
RR	11,124	24,268	13,174	10,801	15,364	19,056	23,617	24,913	12,575	154,891
AP	4,739	7,201	1,676	1,954	2,417	2,911	4,582	1,827	1,893	29,201
MA	45,563	25,317	18,087	13,483	16,054	13,944	17,146	13,896	15,494	178,984
TO	2,340	2,998	1,243	1,054	1,875	1,213	2,143	1,952	1,274	16,092
Total	533,818	518,039	461,001	340,502	448,434	398,850	595,104	585,126	548,163	4,429,038

Source: Adapted from PRODES⁶

I – PRODES identifies deforestation from August of one year to July of the following year.

II – Area based on maps made available by PRODES.

III – Deforested areas in Mato Grosso, Tocantins and Maranhão that lie within the Amazon Biome.

IV – There are small differences in values compared to prior years because INPE updated the PRODES database in 2017, generating some incompatibility between the databases.

Figure 3 shows the PRODES deforestation data for the period 2002-2017 in the 95 municipalities of the Amazon Biome that were monitored by the Soy Moratorium in 2017/18. The graph registers a sharp reduction in deforestation after the Soy Moratorium was implemented. The average deforestation rates identified by PRODES in these municipalities fell from 8,037 km²/year in the period 2002-2008 (before the Moratorium) to 1,548 km²/year between 2009 and 2017 (after the Moratorium). In other words, the average rate has fallen over fivefold during the Soy Moratorium. Furthermore, the share of the monitored municipalities in the total deforested areas of the Legal Amazon fell from 44% in the period 2002-2008, to 24% in the period 2009-2017. The 2017 deforestation rate in the seven soy-producing states in Legal Amazon fell 12.0%, though it still remains a little above the average rate of the last eight years (Figure 2). In the 95 soy-producing municipalities, the fall was 18.6% when compared with the rates of the prior year, indicating a tendency to stability in deforestation during the Soy Moratorium (Figure 3). This shows that the mechanisms used to reduce deforestation after the Moratorium was implemented are more effective in the soy-producing municipalities than in Legal Amazon as a whole.

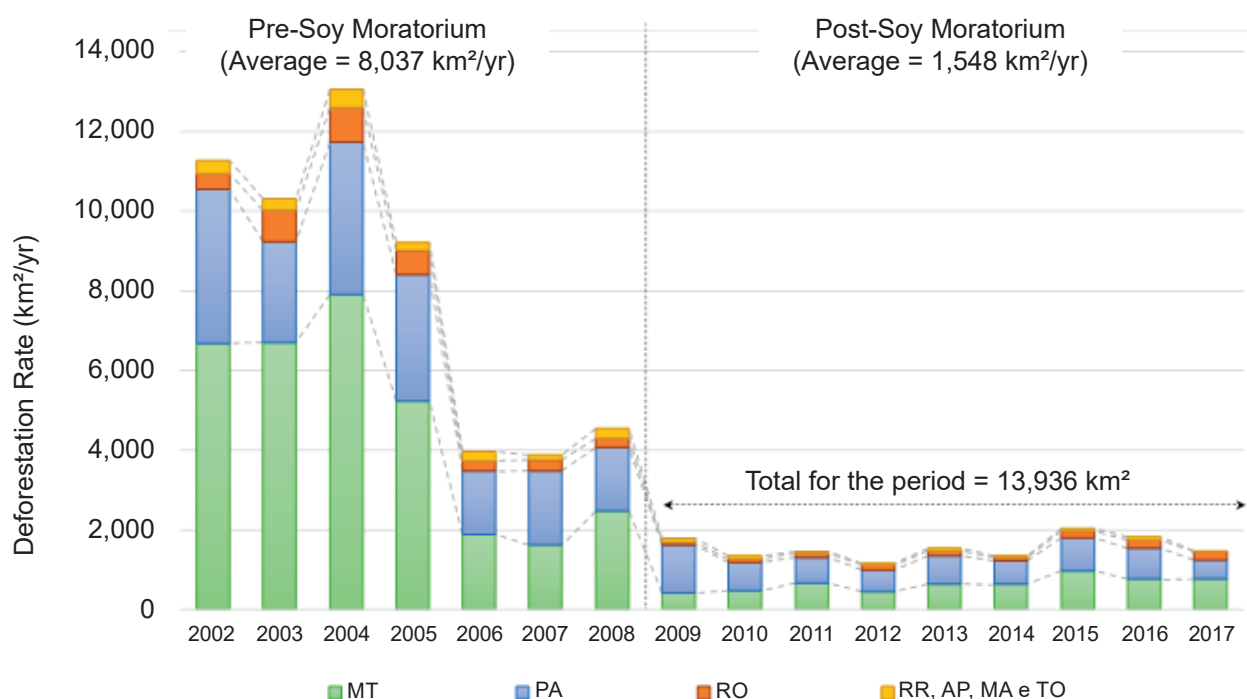


Figure 3. Deforestation rates calculated from PRODES for the 95 monitored municipalities in the Amazon Biome, highlighting the years before and after the Soy Moratorium

Source: Adapted from PRODES⁶

3.3 Aggregation of adjacent deforestation

The GTS established that deforested areas over 25 hectares, mapped by PRODES, would be monitored. A significant portion of the deforestation occurs in small areas that gradually increase in size over the years. Where these areas are adjacent, they must be aggregated year after year and they are incorporated into the monitoring process when the sum of adjacent deforested areas reaches 25 hectares. To exemplify, Figure 4 illustrates the aggregation of three adjacent polygons deforested in different years. Before aggregation, the individual polygons had less than 25 hectares each; with aggregation, the total exceeds 25 hectares, and they are therefore monitored. This aggregation encompasses all the polygons, since even polygons with more than 25 hectares increase in size as adjacent areas are cleared.

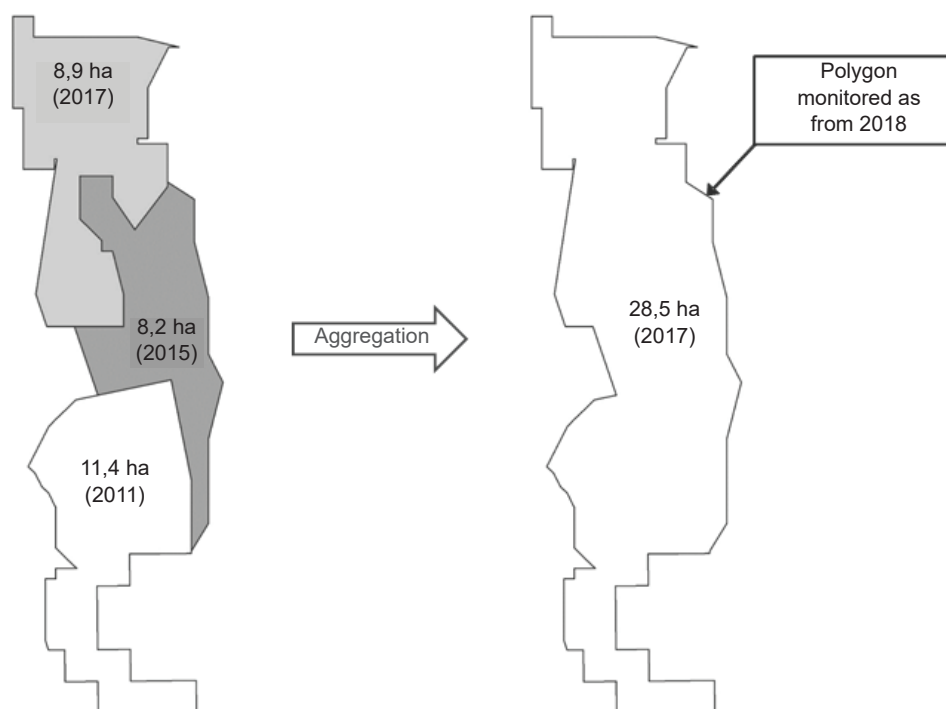


Figure 4. Example of aggregation of three adjacent polygons mapped by PRODES between 2009 and 2017, forming a single polygon over 25 hectares that began to be monitored in the 2017/18 crop

3.4 Identification of soy in deforested areas

The combined analysis of remote sensing satellite images acquired from sensors with different spatial resolutions ensures the identification of soy crops in the deforested areas monitored by the Soy Moratorium. Approximately 100 images from the MODIS sensor on the Terra satellite were used, as well as about 800 images from the Landsat-7 and Landsat-8 satellites. In addition, some 500 images from the Sentinel-2A and Sentinel-2B satellites were used.

The acquisition dates of the images took into consideration the soy calendar in the different regions analysed. To monitor soy crops in the states of Mato Grosso, Rondônia and Tocantins, images from the MODIS sensor were obtained between June 2017 and April 2018. In the states of Maranhão, Pará, Roraima and Amapá, because of the different soy-planting calendar, the acquisition period for the images was extended to August 2018.

The method used to detect the presence of soy was based on an indicator called Crop Enhancement Index (CEI¹²) that underlines the difference in the values of a vegetation indicator called Enhanced Vegetation Index (EVI¹³) at two specific moments in the soy calendar: a) in the off-season, before the soy growth season, when EVI values for soy are relatively lower than those for regenerating forest or pastures (MinEVI, Figure 5), and b) when the soy is well developed and shows higher EVI values than regenerating forest, savannah or pastures (MaxEVI, Figure 5).

High CEI values indicate the presence of soy, or possibly another annual crop with similar characteristics. Regenerating forest or pastures show low CEI values as they have smaller EVI seasonal variations when compared to soy (Figure 5). Thus, CEI allows differentiation between soy and other land uses and cover, such as regenerating forest or pastures.

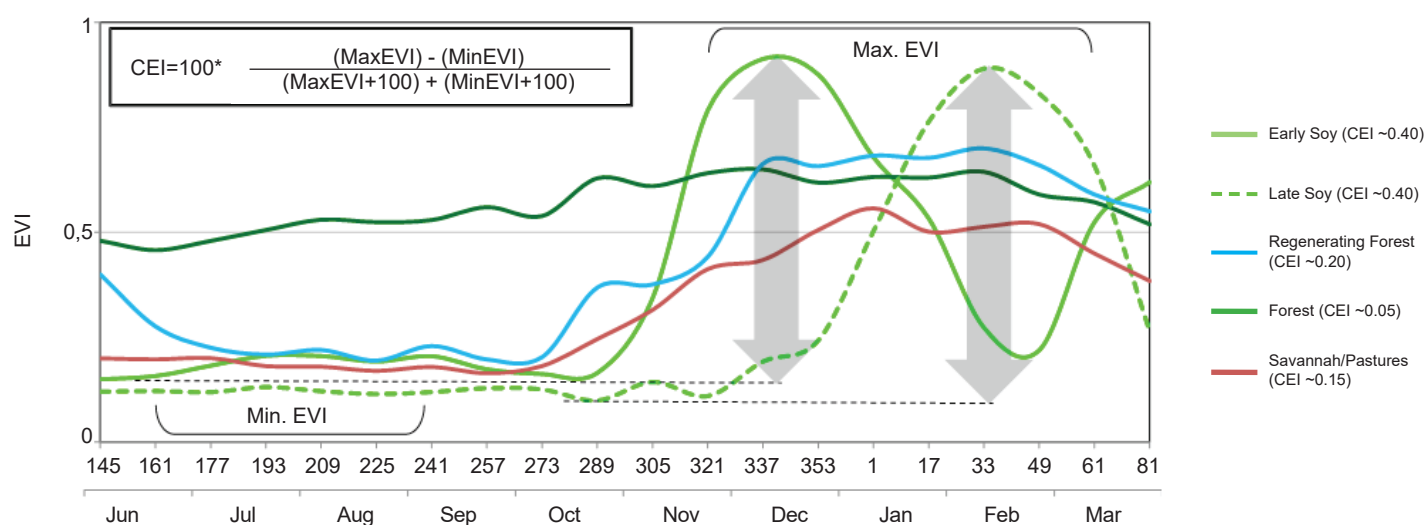


Figure 5. Example of temporal variation in EVI values for: a1) early soy; a2) late soy – Mato Grosso agricultural calendar; b) forest; c) regenerating forest; and d) pastures. Also shown are the periods in which the minimum (MinEVI) and maximum (MaxEVI) values are obtained to calculate CEI

Figure 6 illustrates the sequence of analysing and identifying soy crops in the satellite images. Figure 6a is a CEI image highlighting soy areas in dark blue, differentiating them from other targets in the image which do not have the appearance of an annual crop. Figure 6c is a detail of this CEI image where two deforested polygons can be seen: one with a low CEI value (light green) without the presence of an annual crop and the other with the presence of an annual crop (dark blue). Confirmation of an annual culture such as soy was made, in this case, with the OLI/Landsat-8 image obtained on 10 January 2018, in which 721 hectares of soy were identified and mapped in this deforested polygon, as shown in Figure 6d.

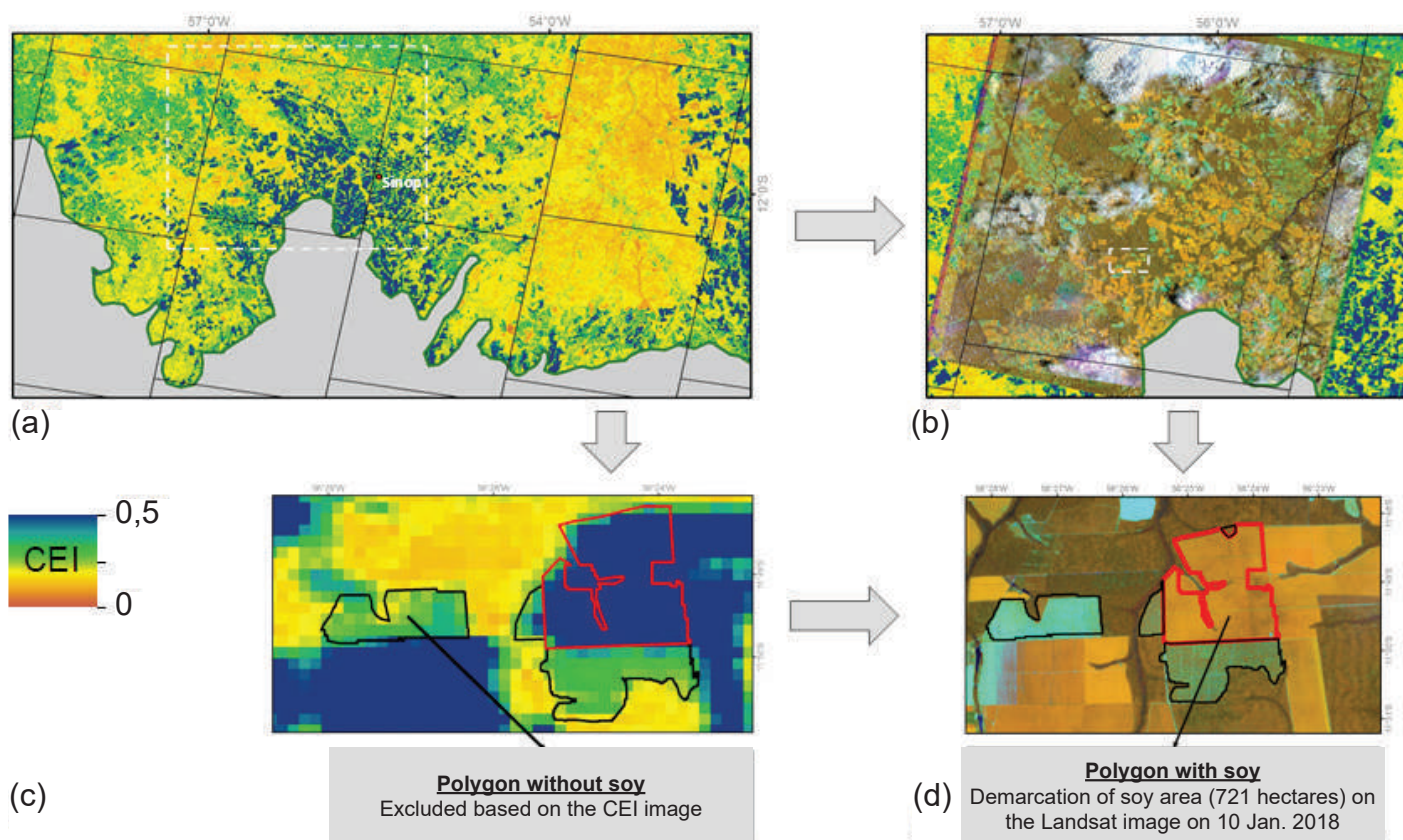


Figure 6. Sequence identifying and mapping soy crops from satellite images of deforested polygons: a) CEI image obtained from EVI/MODIS images; b) OLI/Landsat-8 image on 10 January 2018; c) detail of CEI image identifying areas without soy; d) detail of OLI/Landsat-8 demarcating soy crops in a deforested polygon and evaluating the planted area

4 RESULTS

4.1 Selection of deforested areas mapped by PRODES

In the 95 municipalities monitored by the Soy Moratorium, PRODES mapped a deforested area of 1,393,633 hectares (Table 2) from 2009 to 2017. Table 2 shows that the deforestation category less than or equal to 25 hectares had 540,154 hectares before aggregation of adjacent polygons, representing 39% of the total deforested area. After aggregation (see the methodology described in Item 3.3), this area was reduced to 266,616 hectares, showing that a significant portion (273,538 hectares) left the category less than or equal to 25 hectares and was aggregated into a larger category, therefore becoming subject to monitoring. With this change, the category less than or equal to 25 hectares then represented just 19% of the total.

Table 2. Number (n) and area in hectares (ha) of the aggregated and non-aggregated polygons mapped, with and without aggregation of deforested polygons, between 2009 and 2017 in the 95 monitored municipalities

Categories	PRODES - Not Aggregated		PRODES - Aggregated	
	n	ha	n	ha
≤ 25 ha	63,448	540,154	25,075	266,616
25 to 50 ha	5,822	198,908	4,456	155,951
50 to 100 ha	2,270	156,062	2,324	161,304
≥100 ha	1,782	498,525	2,230	809,762
Total	73,322	1,393,648	34,085	1,393,633
Total > 25 ha	9,874	853,494	9,010	1,127,017

*The aggregation procedure for the 73,322 polygons caused a residual reduction of 15 hectares in the total deforested area (1,393,633 hectares).

These PRODES aggregated polygons with an area over 25 hectares are broken down by state in Table 3. The 58 soy-producing municipalities in the Amazon Biome located in Mato Grosso state had a deforested area of 485,534 hectares, equivalent to 43.3% of the area deforested in the 95 municipalities monitored by the Soy Moratorium. However, the 16 municipalities in Pará state had a larger area – 522,497 hectares, representing 46.3% of the total deforested area. Rondônia state's ten municipalities had 87,219 hectares in deforested land, or 7.7% of the total. In the three municipalities in Roraima state and the two municipalities in Amapá state, the deforested areas were 6,563 hectares (0.6% of the total deforestation) and 939 hectares (0.1% of the deforestation) respectively. The three municipalities in Maranhão state and the three municipalities in Tocantins states had deforested areas of 21,464 hectares (1.9% of the deforestation) and 2,800 hectares (0.2% of the deforestation) respectively.

Table 3. Deforested area in hectares (ha) in the period of the Soy Moratorium, in the 95 municipalities in the states of Mato Grosso (MT), Pará (PA), Rondônia (RO), Roraima (RR), Amapá (AP), Maranhão (MA) and Tocantins (TO)

Categories	MT	PA	RO	RR	AP	MA	TO	Total
	ha	ha	ha	ha	ha	ha	ha	ha
25 to 50	59,282	71,506	15,807	2,395	654	5,562	746	155,951
50 to 100	66,544	71,027	15,263	1,540	147	6,321	463	161,304
>100	359,709	379,964	56,150	2,628	138	9,582	1,591	809,762
Total	485,534	522,497	87,219	6,563	939	21,464	2,800	1,127,017

According to the criteria established by the GTS, the monitoring of soy crops is restricted to deforestation in private rural properties (Item 3.1) and to deforestation partially within the Conservation Units (UC), indigenous lands (TI) and settlements (Ass), totalling 839,233 hectares (Table 4), corresponding to 74% of the total deforested area in polygons with over 25 hectares.

Table 4. Distribution of deforested areas after the Soy Moratorium, in private properties, Conservation Units (UC), Indigenous Lands (TI) and Settlements (Ass), by state, in hectares (ha)

Deforestation*	MT	PA	RO	RR	AP	MA	TO	Total
	ha	ha	ha	ha	ha	ha	ha	ha
a) Outside UC, TI, Ass	373,655	250,583	54,028	2,103	779	11,770	2,442	695,360
b) Partially in UC, TI, Ass	36,678	78,817	23,514	1,451	31	3,259	124	143,873
c) Wholly in UC, TI, Ass	75,202	193,096	9,677	3,010	130	6,436	234	287,784
Total	485,534	522,497	87,219	6,563	939	21,464	2,800	1,127,017
Total Monitored (a+b)	410,333	329,400	77,542	3,554	809	15,029	2,566	839,233

* Deforestation in polygons with more than 25 hectares

4.2 Satellite images identify soy in deforested areas

The 839,233 deforested hectares (Table 4) that met the criteria established by the GTS (Item 3.1) were monitored through CEI/MODIS images (Item 3.4, Figure 6) and another 800 images from the Landsat-7 and Landsat-8 satellites, as well as 500 images from the Sentinel-2A and Sentinel-2B satellites that were available for this monitoring. Each deforested polygon was individually inspected through visual interpretation techniques to identify and map the soy crops in these polygons.

Altogether, 638 deforested polygons were identified as having soy crops that did not comply with the 2018 Soy Moratorium, generating 768 contiguous soy areas within these deforested polygons. All the 768 polygons with soy went through a revision process to verify whether they were, in fact, deforested during the period of the Moratorium. This review of the PRODES deforestation dates is necessary because the dates of the images used by PRODES were not selected thinking of the Moratorium, but rather to identify deforestation in each year. The review of the dates was based on the Landsat images obtained from the year 2000 until the closest possible period to that of the Soy Moratorium reference date (22 July 2008), aided by images from the MODIS sensor for the same period. Deforested areas identified with soy in polygons partially within Conservation Units, indigenous lands and settlements were also submitted to a review. Soy areas located only within these special areas were eliminated. After finishing both reviews, 311 polygons or subareas (195 in Mato Grosso state, 81 in Pará state, 30 in Rondônia state, 13 in Maranhão state and one in Tocantins state), with a total of 3,196 hectares of soy, were found to be in compliance with the Soy Moratorium; without the review process, they would have been included in the list of non-compliant polygons.

In this way, in the 2017/18 crop year, 64,316 hectares of soy in 492 polygons were identified as not being in compliance with the Soy Moratorium. Just in Mato Grosso state, 49,013 hectares (Table 5) were identified as being non-compliant, corresponding to 76.2% of the soy detected in the monitoring and 5.3% of the total deforested area in the Amazon Biome portion of this state during the Soy Moratorium (927,587 hectares, Table 1). In Pará state, there were 10,133 hectares of soy (Table 5), representing 15.8% of the soy detected during the monitoring but just 0.4% of the state's deforested area during the Moratorium (2,355,009 hectares, Table 1). In Rondônia state, 1,928 hectares of soy were identified (Table 5), corresponding to 3.0% of the soy detected during monitoring and 0.2% of the total deforested area in this state during the Moratorium (767,274 hectares, Table 1). Maranhão state had 3,160 hectares of soy (Table 5), corresponding to 4.9% of the soy detected during the monitoring and 1.7% of the total deforested area in this state during the Moratorium (178,984 hectares, Table 1). No soy was identified as non-compliant with the Soy Moratorium in the state of Tocantins. In Roraima and Amapá states, the non-compliant soy areas were just 23 hectares and 58 hectares, respectively; however, in these states, soy expansion occurs primarily through conversion of non-forest native vegetation and, therefore, is not mapped by PRODES nor monitored in the context of the Soy Moratorium.

It should be noted that the soy area in deforested polygons with over 100 hectares was 54,631 hectares, equivalent to 85% of the total that does not comply with the Soy Moratorium (Table 5). This means that most of the non-compliant soy is found on private properties that cleared larger tracts of land as, in the 25-50 hectare category, only 4,644 hectares (7.2%) was identified as having soy that did not comply with the Moratorium. Thus, the 266,616 hectares (19%) deforested in polygons with less than 25 hectares (Table 2) – and therefore not monitored – should make a relatively small contribution to the soy production that does not comply with the Soy Moratorium.

¹ A subarea corresponds to part of a contiguous soy polygon.

The Appendix (Item 8) has a complete list of the 492 deforested polygons with soy crops monitored in the 2017/18 crop year.

Table 5. Soy area in hectares (ha) that is not in compliance with the Soy Moratorium, by size of deforested polygon, in the states of Mato Grosso (MT), Pará (PA), Rondônia (RO), Roraima (RR), Amapá (AP), Maranhão (MA) and Tocantins (TO)

Categories	MT	PA	RO	RR	AP	TO	MA	Total
	ha	ha	ha	ha	ha	ha	ha	ha
25 to 50	2,834	1,120	139	23	58	0	470	4,644
50 to 100	2,760	1,375	259	0	0	0	647	5,041
>100	43,419 (89%)	7,639 (75%)	1,530 (79%)	0 (0%)	0 (0%)	0 (0%)	2,043 (65%)	54,631 (85%)
Total	49,013	10,133	1,928	23	58	0	3,160	64,316

Figure 7 shows the 95 monitored municipalities classified by the size of their soy area not in compliance with the Soy Moratorium. Of these, 60 municipalities have non-compliant soy crops (Table 6), while 35 municipalities are fully compliant with the Moratorium. Of the non-compliant municipalities, 19 have between 1,000 and 10,000 hectares, totalling 54,518 hectares representing 85% of the total non-compliant soy area (Figure 7, Table 6). The other 41 non-compliant municipalities, with areas of less than 1,000 hectares, represent 15% (9,798 hectares) of the total (Figure 7, Table 6), equivalent to the area found just in the municipality of Feliz Natal, Mato Grosso state, with 9,507 hectares.

It should be noted that just five municipalities in Mato Grosso state (Feliz Natal, União do Sul, Santa Carmem, Nova Maringá and Porto dos Gaúchos) and two in Pará state (Paragominas and Dom Eliseu) concentrate 52% of the soy area that is not in compliance with the Soy Moratorium.

In first place is Feliz Natal/MT, with a non-compliant area of 9,507 hectares and with 37,287 hectares deforested between 2009 and 2017. In this crop year (2017/18), Altamira and Novo Progresso, both in Pará state, were added to the list of monitored municipalities, and they are in first and second places among those who cleared the most land, with 263,401 hectares and 116,004 hectares respectively, although this is insignificant in terms of their 721 soy hectares that are not in compliance with the Soy Moratorium.

- 2 municipalities with soy areas over 5,000 hectares (Feliz Natal and União do Sul, both in Mato Grosso state)
- 5 municipalities with soy areas between 2,500 hectares and 5,000 hectares (Santa Carmem, Porto dos Gaúchos and Nova Maringá in Mato Grosso, and Dom Eliseu and Paragominas in Pará state)

- 2 municipalities > 5.000 ha
- 5 municipalities 2.501 - 5.000 ha
- 12 municipalities 1.001 - 2.500 ha
- 9 municipalities 501 - 1.000 ha
- 32 municipalities 1 - 500 ha
- 35 municipalities Zero hectares

Amazon Biome boundary
State boundaries

7 municipalities concentrate ~52% of the soy not in compliance with the Soy Moratorium

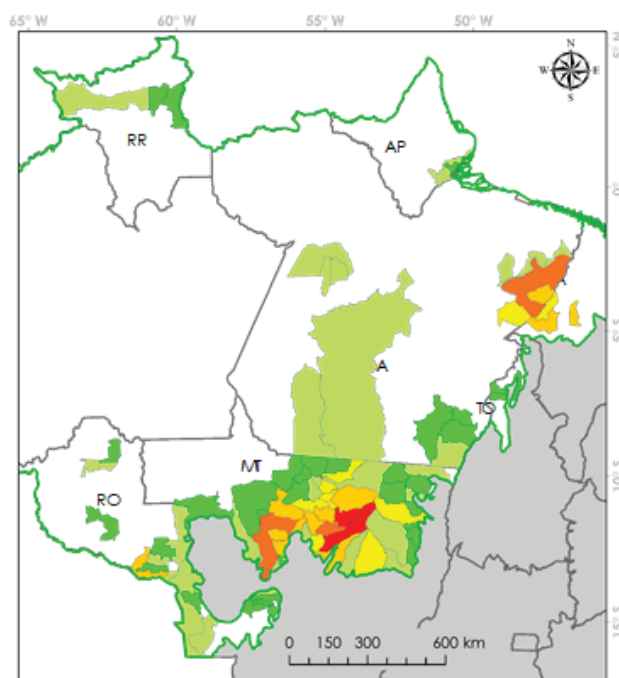


Figure 7. Spatial distribution of the 95 municipalities analysed, classified by the soy area not in compliance with the Soy Moratorium in the 2017/18 crop year

From 2009 to 2017, in the 95 monitored municipalities, 1,393,633 hectares were cleared (Table 2), of which 64,316 hectares were converted to soy. In other words, soy was directly responsible for 4.6% of the deforestation in the municipalities evaluated by the Soy Moratorium. By the same token, 95.4% of the land cleared in these soy-producing municipalities was not related to soy production.

Table 6. List of the 60 municipalities with soy not in compliance with the Soy Moratorium in the 2017/18 crop year

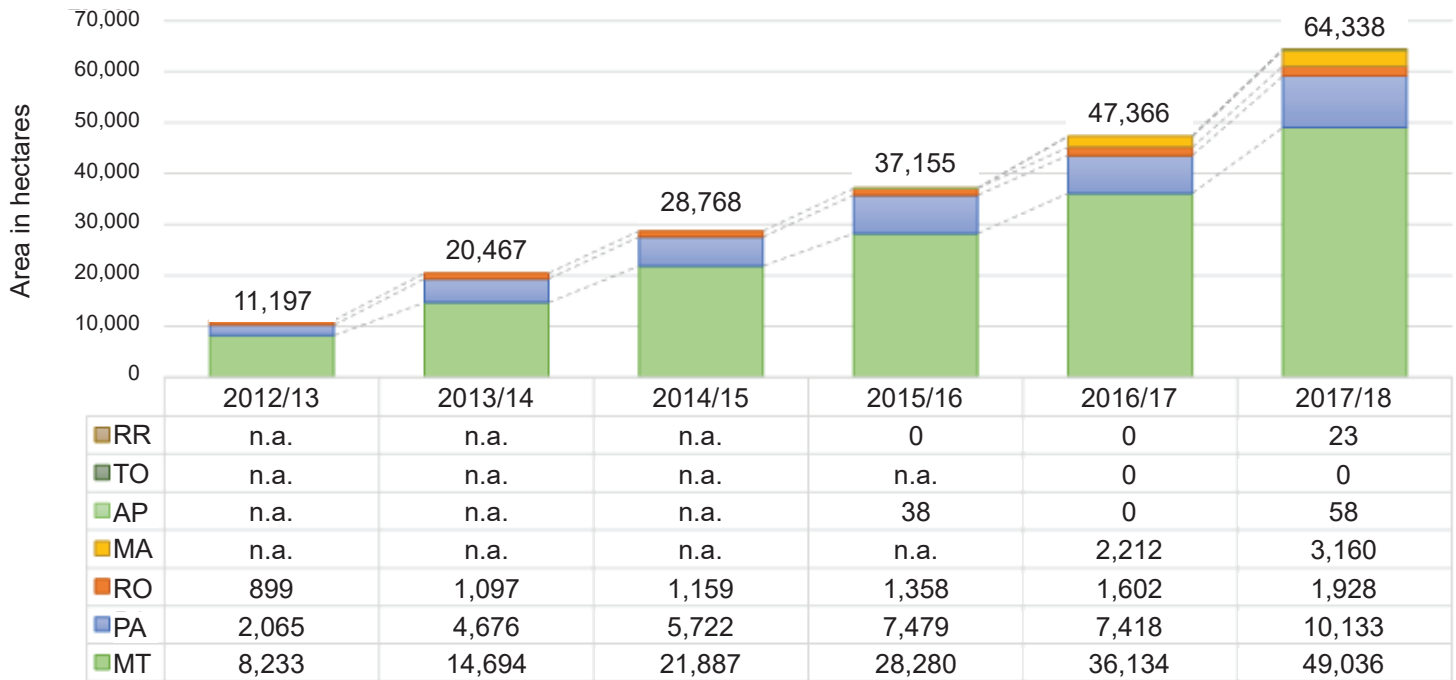
Municipality	State	Polygons with soy (n)	Soy area in 2017/18 (ha)	Deforested area from 2009 to 2017 (ha)	% soy of deforestation
Feliz Natal	MT	41	9,507	37,287	25.5%
União do Sul	MT	18	5,075	18,230	27.8%
Santa Carmem	MT	18	4,870	12,030	40.5%
Nova Maringá	MT	29	4,752	21,696	21.9%
Porto dos Gaúchos	MT	13	2,690	14,649	18.4%
Ipiranga do Norte	MT	8	2,499	6,307	39.6%
Cláudia	MT	22	2,427	15,829	15.3%
Itanhangá	MT	15	2,422	20,826	11.6%
Nova Ubiratã	MT	16	2,419	20,298	11.9%
Tapurah	MT	13	1,832	7,208	25.4%
Marcelândia	MT	21	1,762	26,661	6.6%
Tabaporã	MT	7	1,381	14,952	9.2%
Sinop	MT	6	1,277	6,993	18.3%
Itaúba	MT	5	664	14,485	4.6%
São Félix do Araguaia	MT	6	648	11,475	5.6%
Nova Santa Helena	MT	11	627	3,110	20.2%
Vera	MT	6	601	3,477	17.3%
Terra Nova do Norte	MT	5	579	5,039	11.5%
Matupá	MT	6	538	14,692	3.7%
Gaúcha do Norte	MT	8	511	20,679	2.5%
São José do Rio Claro	MT	3	389	3,294	11.8%
Querência	MT	6	329	17,333	1.9%
Canarana	MT	1	326	2,338	13.9%
Lucas do Rio Verde	MT	2	190	1,130	16.8%
Sorriso	MT	1	175	397	44.0%
Comodoro	MT	4	91	15,340	0.6%
Diamantino	MT	1	85	241	35.1%
Brasnorte	MT	3	67	14,823	0.4%
Vila Rica	MT	2	49	7,520	0.7%
Porto Alegre do Norte	MT	2	48	1,853	2.6%
Colíder	MT	1	43	3,258	1.3%
Pontes e Lacerda	MT	1	35	3,869	0.9%
Paranatinga	MT	1	34	9,304	0.4%
Peixoto de Azevedo	MT	2	33	33,342	0.1%
Vila Bela da Santíssima Trindade	MT	1	27	14,872	0.2%
Nova Guarita	MT	1	11	1,331	0.9%
Total Mato Grosso State		306	49,013	426,166	11.5%

Municipality	State	Polygons with soy (n)	Soy area in 2017/18 (ha)	Deforested area from 2009 to 2017 (ha)	% soy of deforestation
Paragominas	PA	27	3,275	36,701	8.9%
Dom Eliseu	PA	36	2,986	17,319	17.2%
Ulianópolis	PA	13	1,550	19,085	8.1%
Rondon do Pará	PA	9	983	24,906	3.9%
Altamira	PA	9	492	263,402	0.2%
Novo Progresso	PA	6	229	116,004	0.2%
Belterra	PA	4	187	3,806	4.9%
Ipixuna do Pará	PA	3	144	17,104	0.8%
Mojuí dos Campos	PA	5	95	15,157	0.6%
Santarém	PA	3	89	13,433	0.7%
Nova Esperança do Piriá	PA	3	46	14,736	0.3%
Tailândia	PA	1	32	17,862	0.2%
Santana do Araguaia	PA	1	25	25,302	0.1%
Total Pará State		120	10,133	584,817	1.7%
Pimenteiras do Oeste	RO	6	1,336	4,506	29.6%
Vilhena	RO	4	264	9,965	2.6%
Cabixi	RO	4	123	2,859	4.3%
Corumbiara	RO	2	114	2,023	5.6%
Alto Paraíso	RO	2	50	21,964	0.2%
Rio Crespo	RO	2	41	5,090	0.8%
Total Rondônia State		20	1,928	46,408	4.2%
Buriticupu	MA	15	1,339	9,805	13.7%
Açailândia	MA	19	1,119	9,249	12.1%
Itinga do Maranhão	MA	9	702	11,685	6.0%
Total Maranhão State		43	3,160	30,738	10.3%
Alto Alegre	RR	1	23	9,622	0.2%
Total Roraima State		1	23	9,622	0.2%
Macapá	AP	2	58	2,051	2.8%
Total Amapá State		2	58	2,051	2.8%
Overall Total		492	64,316	1,099,802	5.8%

NB: The following 35 municipalities are in full compliance with the Soy Moratorium for the 2017/18 crop year: Mato Grosso state – Bom Jesus do Araguaia, Canabrava do Norte, Carlinda, Confresa, Denise, Guarantã do Norte, Juara, Juína, Nortelândia, Ribeirão Cascalheira, Tangará da Serra, Nova Marilândia, Alta Floresta, Alto Boa Vista, Santo Afonso, São José do Xingu, Nova Lacerda, Nova Canaã do Norte, Nova Mutum, Novo Mundo, Novo Horizonte do Norte and Santa Cruz do Xingu; Pará state – Santa Maria das Barreiras, Cumaru do Norte and Redenção; Rondônia state – São Miguel do Guaporé, Cerejeiras, Chupinguaia and Cujubim; in Roraima state – Boa Vista and Bonfim; Amapá state – Itaubal; and Tocantins state – Piraquê, Araguaína and Santa Fé do Araguaia.

4.3 Advance of non-compliant soy in the last six crops

Based on the new reference date for the Soy Moratorium that considers soy crops in areas deforested after 22 July 2008, the average annual rate of the increase in soy crops that do not comply with the Soy Moratorium is 10,719 hectares per year. This number has remained relatively constant over the last six years, with a slight tendency to increase in the last crop year, as illustrated in Figure 8.



n.a. = not evaluated

Figure 8. Evolution of the soy area not in compliance with the Soy Moratorium in the states of Mato Grosso (MT), Pará (PA), Rondônia (RO), Maranhão (MA), Amapá (AP), Tocantins (TO) and Roraima (RR), in the crop years from 2012/13 to 2017/18

The gradual increase in soy areas not in compliance with the Soy Moratorium, seen over the last six crop years, is mainly due to the longer period of time since 22 July 2008. The conversion of forest areas to agriculture requires the complete removal of trunks and roots, as well as soil correction. This implies that the process for conversion to soy could take some years, and it is also common to grow rice for a year or two before planting soy in areas that have been recently deforested.

Figure 9 shows the soy area in non-compliance with the Soy Moratorium in the 2017/18 crop year, by year of the deforestation mapped by PRODES. As can be seen, 46% (29,468 hectares) of the area planted with soy was grown on deforested land observed in the first three years (2009-2011) of the Moratorium. Moreover, the soy area in more recently deforested areas (2015-2017) had a significant portion, 24% or 15,489 hectares, of forest converted to soy.

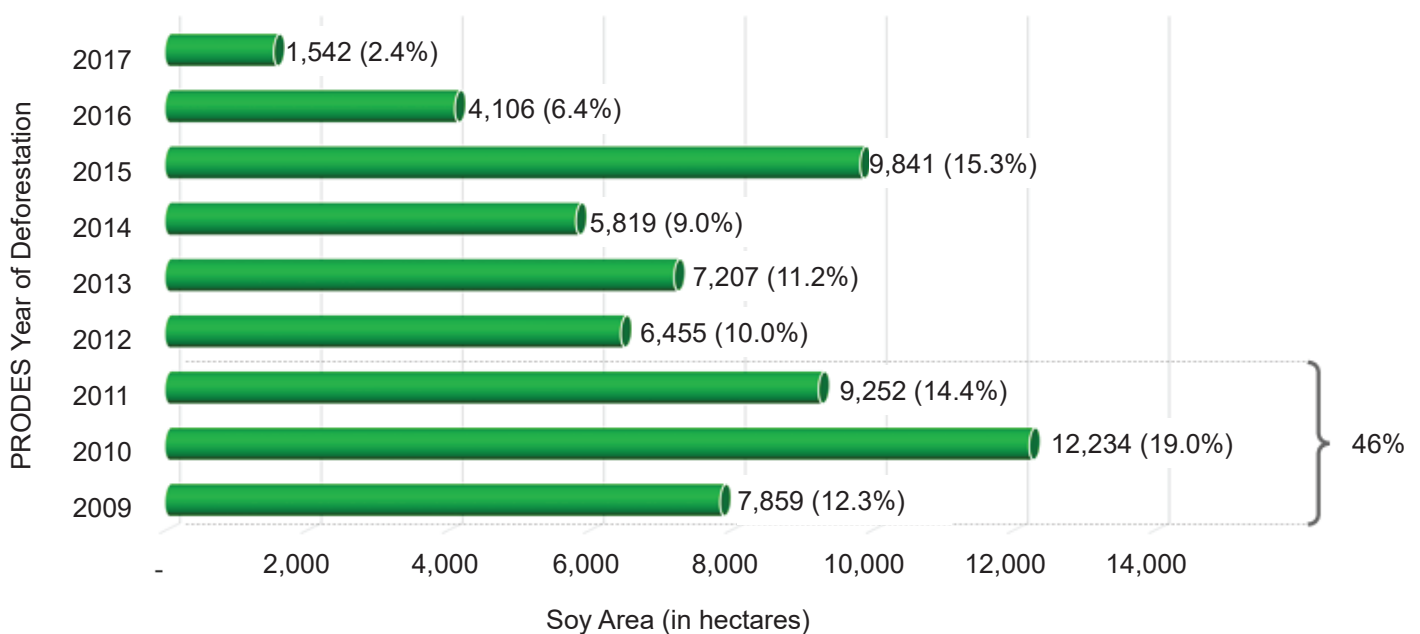


Figure 9. Soy area not in compliance with the Soy Moratorium in the 2017/18 crop year, by year of deforestation

4.4 Relevance of soy in recent deforestation in the Amazon Biome

The Brazilian 2017/18 soy crop was 119.3 million tons, grown on an area of 35.1 million hectares⁴. Compared to last year's crop, there was an increase of 4.6% in production due to the 3.6% increase in planted area and a 0.9% gain in productivity. There were gains in productivity in all the Amazon states, except Pará which registered a fall of 14.8% compared to the prior year⁴.

In the Amazon Biome, 4.66 million hectares were planted in the 2017/18 crop year, representing 13.3% of the total Brazilian planted area. Thus, the 64,316 hectares of soy in areas that have been deforested during the Soy Moratorium represent just 1.4% of the current soy area in the Amazon Biome. Since implementation of the Moratorium in the 2006/07 crop year, the soy area has quadrupled, going from 1.14 million hectares to the current 4.66 million hectares of soy, a considerable increase in a period when the annual deforestation rates have slowed notably (Figure 10). This increase is primarily due to the expansion of soy into pastures that were cleared before the Soy Moratorium¹⁴ was implemented, showing the efficacy of this initiative in mitigating the advance of soy into newly deforested areas, without hindering the advance of the economic activity of soy production in the Amazon Biome, as illustrated in Figure 10.

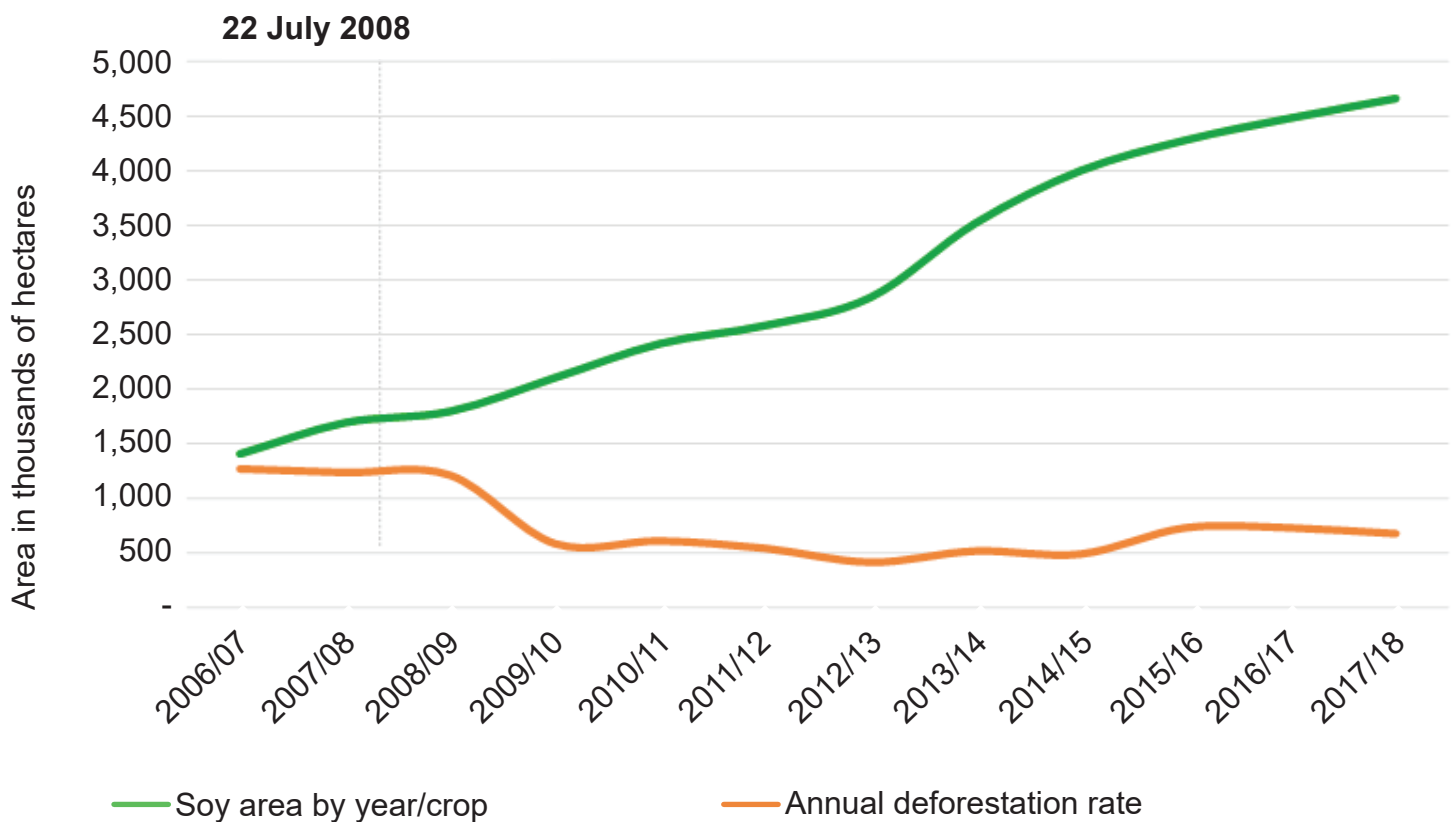
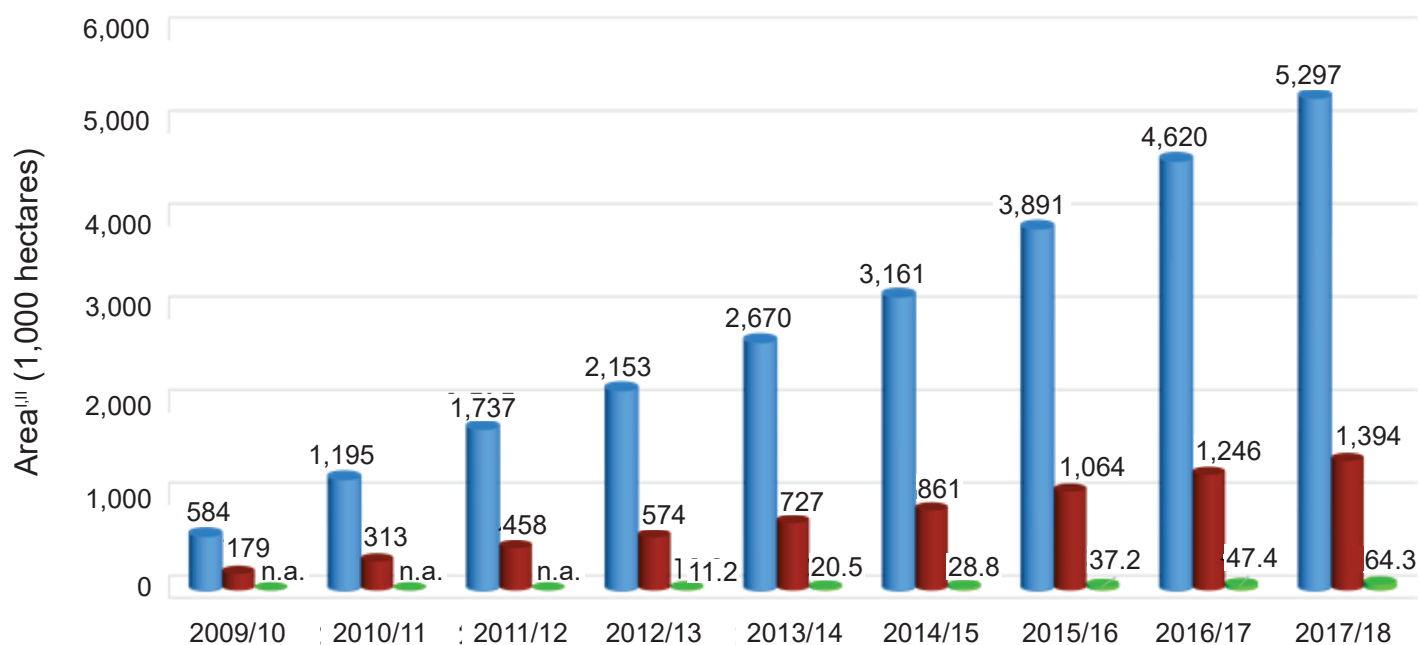


Figure 10. Evolution of the total soy area versus the annual deforestation rate over the last twelve crops in the Amazon Biome

Source: Adapted from Agrosatélite⁴ and PRODES⁶

Figure 11 is a comparison of the deforestation in the Amazon Biome and in the 95 monitored municipalities (Table 2), and the soy production in deforested areas during the period of the Soy Moratorium (Table 5). The monitored municipalities were responsible for 26.3% of the deforestation in the Amazon Biome, with 4.6% of this area used for soy production in the 2017/18 crop year.



■ PRODES deforestation in the Amazon Biome, accumulated after 2008

■ PRODES deforestation in the monitored municipalities, within the Amazon Biome, accumulated after 2008

■ Soy area not in compliance with the Soy Moratorium in the monitored municipalities

I Área calculada com base nos mapas disponibilizados pelo PRODES⁶;

II Podem existir diferenças nos valores em relação aos relatórios dos anos anteriores em razão da atualização na base do PRODES, realizada pelo INPE, que gerou algumas incompatibilidades entre as bases.

Figure 11. Evolution of accumulated deforestation (Amazon Biome and the 95 municipalities) and of the soy not in compliance with the Soy Moratorium in the monitored municipalities in 2017/18



5

CONCLUSIONS

Based on satellite images of the 2017/18 crop, 64,300 hectares of soy were identified as having been planted in areas of the Amazon Biome deforested since 22 July 2008, which represents an increase of 36% over the prior year (47,400 hectares). The state of Mato Grosso had the largest share of soy that was not in compliance with the Soy Moratorium – 49,010 hectares (76.2%), followed by Pará state with 10,130 hectares (15.8%), Maranhão state with 3,160 hectares (4.9%) and Rondônia state with 1,930 hectares (3.0%).

Since the beginning of the Soy Moratorium's new mark, 5,297,000 hectares have been deforested in the Amazon Biome. The 95 monitored municipalities responsible for 97% of the Biome's soy area in the 2017/18 crop year had a deforested area of 1,394,000 hectares or 26% of this total. The average deforestation rate observed in these municipalities during the Soy Moratorium (2008/09 to 2017/18) is 5.2 times lower than that in the prior period (2001/02 to 2007/08), which shows how this initiative has contributed to the reduction of deforestation in the Amazon Biome over the last few years. This survey shows that soy production is responsible for 1.4% of the Biome's area deforested after 2008. However, even looking only at that portion of the Biome where 97% of the soy is grown (the 95 municipalities), it is still responsible for just 4.6% of the deforested area, which means that 95.4% of the deforestation that occurred during the Soy Moratorium is associated with other land uses, taking into account only the area evaluated by the Moratorium.

Finally, it is important to highlight that, since the beginning of the Soy Moratorium, the soy area in the Amazon Biome has more than quadrupled, going from 1.14 million hectares in the 2006/07 crop year to 4.66 million hectares in the 2017/18 crop year, corresponding to 13.3% of Brazil's total soy area (35.1 million hectares). Soy has primarily expanded into pasture areas that were deforested before the Soy Moratorium was implemented, showing the efficacy of this initiative in allowing food production to develop without stimulating forest conversion into soy production.

São Paulo, 18 December 2018

André Nassar

President



Bernardo Rudorff

Director



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7

TECHNICAL TEAM

7.1 AGROSATÉLITE GEOTECNOLOGIA APLICADA LTDA

- **Overall Coordinator:** Bernardo Rudorff
- **Technical Coordinator:** Joel Risso
- **Technical Team:** Charles Baldi, Daniel Alves de Aguiar e Moisés Pereira Galvão

7.2 ABIOVE

- **Overall Coordinator:** André Nassar
- **Technical Coordinator:** Bernardo Machado Pires
- **Staffers:** Pedro Moré Garcia

7.3 INPE

- **Institutional Support:**



8.1 Polygons with Soy in Mato Grosso State

ID	Area of Polygon (ha)	State	Municipality	Soy Area (ha)
1552	37	MT	BRASNORTE	37
1566	49	MT	BRASNORTE	18
1614	41	MT	BRASNORTE	12
498	713	MT	CANARANA	326
2025	650	MT	CLÁUDIA	650
1855	571	MT	CLÁUDIA	522
1929	218	MT	CLÁUDIA	218
1834	497	MT	CLÁUDIA	161
2179	152	MT	CLÁUDIA	152
2156	96	MT	CLÁUDIA	96
1915	93	MT	CLÁUDIA	93
2211	290	MT	CLÁUDIA	70
2090	216	MT	CLÁUDIA	53
2007	46	MT	CLÁUDIA	46
1997	51	MT	CLÁUDIA	44
2029	43	MT	CLÁUDIA	43
2214	110	MT	CLÁUDIA	41
2220	77	MT	CLÁUDIA	41
2041	41	MT	CLÁUDIA	41
1921	39	MT	CLÁUDIA	39
1932	37	MT	CLÁUDIA	35
2288	29	MT	CLÁUDIA	27
2173	45	MT	CLÁUDIA	23
2098	28	MT	CLÁUDIA	19
2190	145	MT	CLÁUDIA	8
2212	38	MT	CLÁUDIA	8
2896	46	MT	COLÍDER	43
744	84	MT	COMODORO	53
295	32	MT	COMODORO	16
291	35	MT	COMODORO	15
281	28	MT	COMODORO	7
238	85	MT	DIAMANTINO	85
903	3,902	MT	FELIZ NATAL	1,951
836	1,028	MT	FELIZ NATAL	1,016
793	933	MT	FELIZ NATAL	758
1045	862	MT	FELIZ NATAL	706
1137	1,108	MT	FELIZ NATAL	459

ID	Area of Polygon (ha)	State	Municipality	Soy Area (ha)
1019	611	MT	FELIZ NATAL	440
1270	1,153	MT	FELIZ NATAL	412
927	520	MT	FELIZ NATAL	406
846	763	MT	FELIZ NATAL	341
996	1,303	MT	FELIZ NATAL	291
856	1,191	MT	FELIZ NATAL	266
875	926	MT	FELIZ NATAL	227
1293	1,422	MT	FELIZ NATAL	192
979	352	MT	FELIZ NATAL	189
794	177	MT	FELIZ NATAL	177
1187	174	MT	FELIZ NATAL	155
1034	233	MT	FELIZ NATAL	153
1303	398	MT	FELIZ NATAL	151
1208	233	MT	FELIZ NATAL	132
1310	149	MT	FELIZ NATAL	124
1217	277	MT	FELIZ NATAL	118
1011	109	MT	FELIZ NATAL	109
1280	369	MT	FELIZ NATAL	105
841	126	MT	FELIZ NATAL	93
853	133	MT	FELIZ NATAL	78
1074	774	MT	FELIZ NATAL	78
993	70	MT	FELIZ NATAL	70
1126	130	MT	FELIZ NATAL	54
1285	37	MT	FELIZ NATAL	37
1006	35	MT	FELIZ NATAL	30
921	27	MT	FELIZ NATAL	27
883	26	MT	FELIZ NATAL	26
797	29	MT	FELIZ NATAL	26
1098	37	MT	FELIZ NATAL	24
1183	37	MT	FELIZ NATAL	18
762	108	MT	FELIZ NATAL	16
1113	142	MT	FELIZ NATAL	16
1027	42	MT	FELIZ NATAL	12
1305	76	MT	FELIZ NATAL	11
766	174	MT	FELIZ NATAL	5
1044	113	MT	FELIZ NATAL	2
517	1,198	MT	GAÚCHA DO NORTE	182
425	234	MT	GAÚCHA DO NORTE	109
310	217	MT	GAÚCHA DO NORTE	81
494	445	MT	GAÚCHA DO NORTE	75
632	32	MT	GAÚCHA DO NORTE	32
545	34	MT	GAÚCHA DO NORTE	20
575	53	MT	GAÚCHA DO NORTE	7

ID	Area of Polygon (ha)	State	Municipality	Soy Area (ha)
523	29	MT	GAÚCHA DO NORTE	5
1682	1,706	MT	IPIRANGA DO NORTE	860
1835	452	MT	IPIRANGA DO NORTE	452
1488	491	MT	IPIRANGA DO NORTE	410
1825	302	MT	IPIRANGA DO NORTE	302
1676	168	MT	IPIRANGA DO NORTE	168
1812	143	MT	IPIRANGA DO NORTE	143
1826	122	MT	IPIRANGA DO NORTE	122
1818	43	MT	IPIRANGA DO NORTE	43
1633	1,551	MT	ITANHANGÁ	1,046
1673	1,669	MT	ITANHANGÁ	357
1646	324	MT	ITANHANGÁ	275
1220	186	MT	ITANHANGÁ	186
1308	241	MT	ITANHANGÁ	147
1277	136	MT	ITANHANGÁ	127
1219	64	MT	ITANHANGÁ	62
1297	45	MT	ITANHANGÁ	43
1278	46	MT	ITANHANGÁ	40
1289	203	MT	ITANHANGÁ	39
1254	38	MT	ITANHANGÁ	37
1323	68	MT	ITANHANGÁ	23
1550	57	MT	ITANHANGÁ	23
1311	158	MT	ITANHANGÁ	12
1479	107	MT	ITANHANGÁ	6
2462	424	MT	ITAÚBA	403
2435	788	MT	ITAÚBA	155
2425	181	MT	ITAÚBA	93
2314	50	MT	ITAÚBA	11
2311	39	MT	ITAÚBA	2
650	514	MT	LUCAS DO RIO VERDE	128
659	149	MT	LUCAS DO RIO VERDE	63
2656	706	MT	MARCELÂNDIA	706
2751	183	MT	MARCELÂNDIA	160
2621	289	MT	MARCELÂNDIA	137
2517	230	MT	MARCELÂNDIA	130
2844	659	MT	MARCELÂNDIA	88
2540	94	MT	MARCELÂNDIA	79
2772	80	MT	MARCELÂNDIA	75
2909	70	MT	MARCELÂNDIA	62
2931	66	MT	MARCELÂNDIA	61
2598	65	MT	MARCELÂNDIA	57
2921	54	MT	MARCELÂNDIA	54
2736	38	MT	MARCELÂNDIA	28

ID	Area of Polygon (ha)	State	Municipality	Soy Area (ha)
2557	29	MT	MARCELÂNDIA	25
2898	26	MT	MARCELÂNDIA	20
2365	34	MT	MARCELÂNDIA	18
2499	447	MT	MARCELÂNDIA	18
2537	57	MT	MARCELÂNDIA	15
2642	27	MT	MARCELÂNDIA	13
2614	37	MT	MARCELÂNDIA	6
2470	62	MT	MARCELÂNDIA	6
2506	130	MT	MARCELÂNDIA	4
3746	289	MT	MATUPÁ	287
3724	113	MT	MATUPÁ	110
3757	92	MT	MATUPÁ	86
3432	26	MT	MATUPÁ	24
3451	49	MT	MATUPÁ	18
3548	28	MT	MATUPÁ	12
3369	31	MT	NOVA GUARITA	11
719	2,418	MT	NOVA MARINGÁ	652
652	590	MT	NOVA MARINGÁ	585
1240	417	MT	NOVA MARINGÁ	417
1602	413	MT	NOVA MARINGÁ	413
717	456	MT	NOVA MARINGÁ	409
1438	406	MT	NOVA MARINGÁ	375
1573	344	MT	NOVA MARINGÁ	344
886	264	MT	NOVA MARINGÁ	264
546	258	MT	NOVA MARINGÁ	258
871	153	MT	NOVA MARINGÁ	138
1251	133	MT	NOVA MARINGÁ	133
1255	117	MT	NOVA MARINGÁ	117
524	109	MT	NOVA MARINGÁ	80
752	71	MT	NOVA MARINGÁ	71
830	60	MT	NOVA MARINGÁ	60
580	81	MT	NOVA MARINGÁ	53
677	93	MT	NOVA MARINGÁ	50
711	55	MT	NOVA MARINGÁ	49
1499	40	MT	NOVA MARINGÁ	40
672	1,030	MT	NOVA MARINGÁ	39
675	254	MT	NOVA MARINGÁ	31
608	31	MT	NOVA MARINGÁ	31
694	30	MT	NOVA MARINGÁ	30
746	27	MT	NOVA MARINGÁ	27
1549	53	MT	NOVA MARINGÁ	27
681	26	MT	NOVA MARINGÁ	26
713	48	MT	NOVA MARINGÁ	16

ID	Area of Polygon (ha)	State	Municipality	Soy Area (ha)
587	36	MT	NOVA MARINGÁ	9
693	26	MT	NOVA MARINGÁ	6
2685	145	MT	NOVA SANTA HELENA	138
2437	121	MT	NOVA SANTA HELENA	119
2514	89	MT	NOVA SANTA HELENA	89
2496	236	MT	NOVA SANTA HELENA	73
2524	61	MT	NOVA SANTA HELENA	61
2555	40	MT	NOVA SANTA HELENA	40
2448	36	MT	NOVA SANTA HELENA	36
2424	32	MT	NOVA SANTA HELENA	32
2449	37	MT	NOVA SANTA HELENA	18
2453	28	MT	NOVA SANTA HELENA	16
2445	34	MT	NOVA SANTA HELENA	4
1350	653	MT	NOVA UBIRATÃ	653
414	812	MT	NOVA UBIRATÃ	554
375	263	MT	NOVA UBIRATÃ	263
415	220	MT	NOVA UBIRATÃ	220
412	958	MT	NOVA UBIRATÃ	146
759	141	MT	NOVA UBIRATÃ	141
409	91	MT	NOVA UBIRATÃ	91
742	65	MT	NOVA UBIRATÃ	65
607	400	MT	NOVA UBIRATÃ	54
623	69	MT	NOVA UBIRATÃ	54
691	43	MT	NOVA UBIRATÃ	43
697	34	MT	NOVA UBIRATÃ	34
624	230	MT	NOVA UBIRATÃ	28
767	47	MT	NOVA UBIRATÃ	25
579	25	MT	NOVA UBIRATÃ	25
611	27	MT	NOVA UBIRATÃ	22
710	34	MT	PARANATINGA	34
3005	298	MT	PEIXOTO DE AZEVEDO	26
3006	54	MT	PEIXOTO DE AZEVEDO	7
25	49	MT	PONTES E LACERDA	35
2578	39	MT	PORTO ALEGRE DO NORTE	31
2579	171	MT	PORTO ALEGRE DO NORTE	17
1780	886	MT	PORTO DOS GAÚCHOS	874
1800	1,188	MT	PORTO DOS GAÚCHOS	733
1899	798	MT	PORTO DOS GAÚCHOS	603
1754	221	MT	PORTO DOS GAÚCHOS	217
1771	68	MT	PORTO DOS GAÚCHOS	56
1675	63	MT	PORTO DOS GAÚCHOS	46
1842	33	MT	PORTO DOS GAÚCHOS	32
1942	48	MT	PORTO DOS GAÚCHOS	30

ID	Area of Polygon (ha)	State	Municipality	Soy Area (ha)
1702	28	MT	PORTO DOS GAÚCHOS	27
1730	1,269	MT	PORTO DOS GAÚCHOS	24
1776	27	MT	PORTO DOS GAÚCHOS	23
1872	28	MT	PORTO DOS GAÚCHOS	21
1863	57	MT	PORTO DOS GAÚCHOS	6
1023	126	MT	QUERÊNCIA	126
880	103	MT	QUERÊNCIA	103
874	44	MT	QUERÊNCIA	41
564	43	MT	QUERÊNCIA	39
819	46	MT	QUERÊNCIA	13
889	42	MT	QUERÊNCIA	8
1665	1,562	MT	SANTA CARMEM	1,562
1870	874	MT	SANTA CARMEM	874
1689	1,113	MT	SANTA CARMEM	758
1679	355	MT	SANTA CARMEM	355
1845	229	MT	SANTA CARMEM	229
1692	533	MT	SANTA CARMEM	208
1701	167	MT	SANTA CARMEM	165
1561	220	MT	SANTA CARMEM	138
1888	126	MT	SANTA CARMEM	126
1709	54	MT	SANTA CARMEM	54
1755	94	MT	SANTA CARMEM	48
1752	58	MT	SANTA CARMEM	48
1670	44	MT	SANTA CARMEM	44
1765	43	MT	SANTA CARMEM	43
1590	45	MT	SANTA CARMEM	42
1601	41	MT	SANTA CARMEM	41
1671	49	MT	SANTA CARMEM	35
1635	46	MT	SANTA CARMEM	28
2039	523	MT	SÃO FÉLIX DO ARAGUAIA	451
2030	79	MT	SÃO FÉLIX DO ARAGUAIA	79
2135	32	MT	SÃO FÉLIX DO ARAGUAIA	32
2024	32	MT	SÃO FÉLIX DO ARAGUAIA	32
2036	64	MT	SÃO FÉLIX DO ARAGUAIA	29
2034	27	MT	SÃO FÉLIX DO ARAGUAIA	27
509	990	MT	SÃO JOSÉ DO RIO CLARO	325
530	46	MT	SÃO JOSÉ DO RIO CLARO	36
459	38	MT	SÃO JOSÉ DO RIO CLARO	29
2017	565	MT	SINOP	551
1990	437	MT	SINOP	427
1848	167	MT	SINOP	167
1856	92	MT	SINOP	92
1993	28	MT	SINOP	28

ID	Area of Polygon (ha)	State	Municipality	Soy Area (ha)
1874	53	MT	SINOP	12
1369	175	MT	SORRISO	175
2020	484	MT	TABAPORÃ	478
2075	376	MT	TABAPORÃ	376
1963	323	MT	TABAPORÃ	309
2046	103	MT	TABAPORÃ	99
2096	51	MT	TABAPORÃ	51
2112	41	MT	TABAPORÃ	41
2419	27	MT	TABAPORÃ	27
881	386	MT	TAPURAH	374
1168	388	MT	TAPURAH	342
1162	285	MT	TAPURAH	285
944	606	MT	TAPURAH	261
918	160	MT	TAPURAH	156
827	258	MT	TAPURAH	105
937	79	MT	TAPURAH	79
703	93	MT	TAPURAH	73
747	42	MT	TAPURAH	42
753	43	MT	TAPURAH	30
929	28	MT	TAPURAH	28
833	27	MT	TAPURAH	27
1169	28	MT	TAPURAH	27
2809	883	MT	TERRA NOVA DO NORTE	456
2789	84	MT	TERRA NOVA DO NORTE	45
2855	42	MT	TERRA NOVA DO NORTE	41
2816	47	MT	TERRA NOVA DO NORTE	26
2770	62	MT	TERRA NOVA DO NORTE	10
1968	2,042	MT	UNIÃO DO SUL	1,543
1902	1,222	MT	UNIÃO DO SUL	1,197
1757	486	MT	UNIÃO DO SUL	486
1791	516	MT	UNIÃO DO SUL	477
1885	558	MT	UNIÃO DO SUL	456
1830	198	MT	UNIÃO DO SUL	198
1821	191	MT	UNIÃO DO SUL	191
1832	151	MT	UNIÃO DO SUL	151
1941	139	MT	UNIÃO DO SUL	114
1948	82	MT	UNIÃO DO SUL	82
1787	78	MT	UNIÃO DO SUL	78
2221	38	MT	UNIÃO DO SUL	38
2128	30	MT	UNIÃO DO SUL	30
1967	365	MT	UNIÃO DO SUL	30
2103	26	MT	UNIÃO DO SUL	26
1931	39	MT	UNIÃO DO SUL	22

ID	Area of Polygon (ha)	State	Municipality	Soy Area (ha)
2147	25	MT	UNIÃO DO SUL	17
2219	29	MT	UNIÃO DO SUL	10
861	203	MT	VERA	203
1326	144	MT	VERA	127
843	123	MT	VERA	123
1396	98	MT	VERA	94
1410	39	MT	VERA	32
1422	39	MT	VERA	23
167	27	MT	VILA BELA DA SANTÍSSIMA TRINDADE	27
3688	41	MT	VILA RICA	31
3634	32	MT	VILA RICA	18
TOTAL MATO GROSSO STATE				49,013

8.2 Polygons with Soy in Pará State

ID	Area of Polygon (ha)	State	Municipality	Soy Area (ha)
5206	462	PA	ALTAMIRA	255
6076	158	PA	ALTAMIRA	57
5231	65	PA	ALTAMIRA	53
5195	59	PA	ALTAMIRA	44
5264	250	PA	ALTAMIRA	40
5508	530	PA	ALTAMIRA	15
5202	26	PA	ALTAMIRA	14
5239	42	PA	ALTAMIRA	11
5229	28	PA	ALTAMIRA	4
8017	171	PA	BELTERRA	75
8493	57	PA	BELTERRA	50
8494	40	PA	BELTERRA	37
8019	26	PA	BELTERRA	26
7207	3,009	PA	DOM ELISEU	604
7474	585	PA	DOM ELISEU	331
6993	324	PA	DOM ELISEU	291
7125	264	PA	DOM ELISEU	246
7409	741	PA	DOM ELISEU	225
7044	179	PA	DOM ELISEU	179
6992	142	PA	DOM ELISEU	130
7287	621	PA	DOM ELISEU	123
7181	120	PA	DOM ELISEU	116
7249	111	PA	DOM ELISEU	104
7025	88	PA	DOM ELISEU	88
7046	82	PA	DOM ELISEU	77
6999	65	PA	DOM ELISEU	65

ID	Area of Polygon (ha)	State	Municipality	Soy Area (ha)
7336	97	PA	DOM ELISEU	65
7134	56	PA	DOM ELISEU	56
7438	368	PA	DOM ELISEU	49
7354	385	PA	DOM ELISEU	47
7335	98	PA	DOM ELISEU	47
7182	46	PA	DOM ELISEU	46
6996	41	PA	DOM ELISEU	41
7222	40	PA	DOM ELISEU	40
7108	35	PA	DOM ELISEU	35
7003	29	PA	DOM ELISEU	29
7176	35	PA	DOM ELISEU	29
7141	32	PA	DOM ELISEU	28
7092	34	PA	DOM ELISEU	28
7106	31	PA	DOM ELISEU	19
7284	83	PA	DOM ELISEU	19
7053	79	PA	DOM ELISEU	16
7170	155	PA	DOM ELISEU	15
7188	55	PA	DOM ELISEU	13
7132	59	PA	DOM ELISEU	13
7351	27	PA	DOM ELISEU	12
7318	35	PA	DOM ELISEU	11
7145	29	PA	DOM ELISEU	10
6945	26	PA	DOM ELISEU	8
8368	67	PA	IPIXUNA DO PARÁ	67
8416	52	PA	IPIXUNA DO PARÁ	48
8353	30	PA	IPIXUNA DO PARÁ	30
8458	31	PA	MOJÚÍ DOS CAMPOS	31
8612	32	PA	MOJÚÍ DOS CAMPOS	28
8441	34	PA	MOJÚÍ DOS CAMPOS	20
8455	41	PA	MOJÚÍ DOS CAMPOS	8
8510	30	PA	MOJÚÍ DOS CAMPOS	7
8609	34	PA	NOVA ESPERANÇA DO PIRIÁ	19
8479	39	PA	NOVA ESPERANÇA DO PIRIÁ	16
8502	59	PA	NOVA ESPERANÇA DO PIRIÁ	11
5835	154	PA	NOVO PROGRESSO	133
5829	43	PA	NOVO PROGRESSO	30
4280	35	PA	NOVO PROGRESSO	27
5761	53	PA	NOVO PROGRESSO	26
6026	46	PA	NOVO PROGRESSO	7
5758	65	PA	NOVO PROGRESSO	6
8609	34	PA	NOVA ESPERANÇA DO PIRIÁ	19
8479	39	PA	NOVA ESPERANÇA DO PIRIÁ	16
8502	59	PA	NOVA ESPERANÇA DO PIRIÁ	11

ID	Area of Polygon (ha)	State	Municipality	Soy Area (ha)
5835	154	PA	NOVO PROGRESSO	133
5829	43	PA	NOVO PROGRESSO	30
4280	35	PA	NOVO PROGRESSO	27
5761	53	PA	NOVO PROGRESSO	26
6026	46	PA	NOVO PROGRESSO	7
5758	65	PA	NOVO PROGRESSO	6
8045	1,768	PA	PARAGOMINAS	1,025
7986	439	PA	PARAGOMINAS	372
8121	500	PA	PARAGOMINAS	201
7836	184	PA	PARAGOMINAS	184
8177	523	PA	PARAGOMINAS	183
8314	153	PA	PARAGOMINAS	153
7976	150	PA	PARAGOMINAS	130
8076	243	PA	PARAGOMINAS	116
8016	124	PA	PARAGOMINAS	114
7982	84	PA	PARAGOMINAS	84
8051	115	PA	PARAGOMINAS	83
8174	84	PA	PARAGOMINAS	65
8460	63	PA	PARAGOMINAS	63
8169	75	PA	PARAGOMINAS	62
8382	100	PA	PARAGOMINAS	56
7754	75	PA	PARAGOMINAS	56
8221	52	PA	PARAGOMINAS	52
7958	50	PA	PARAGOMINAS	50
8029	44	PA	PARAGOMINAS	44
8332	44	PA	PARAGOMINAS	44
7752	34	PA	PARAGOMINAS	34
8302	30	PA	PARAGOMINAS	30
7943	28	PA	PARAGOMINAS	28
8024	115	PA	PARAGOMINAS	14
8271	28	PA	PARAGOMINAS	13
8354	133	PA	PARAGOMINAS	11
8140	33	PA	PARAGOMINAS	9
6987	736	PA	RONDON DO PARÁ	285
6746	316	PA	RONDON DO PARÁ	172
7021	465	PA	RONDON DO PARÁ	80
7016	393	PA	RONDON DO PARÁ	58
7194	70	PA	RONDON DO PARÁ	39
7006	33	PA	RONDON DO PARÁ	33
6855	31	PA	RONDON DO PARÁ	31
6853	30	PA	RONDON DO PARÁ	12
6775	31	PA	RONDON DO PARÁ	4
4383	49	PA	SANTANA DO ARAGUAIA	25

ID	Area of Polygon (ha)	State	Municipality	Soy Area (ha)
8478	55	PA	SANTARÉM	48
8553	36	PA	SANTARÉM	27
8561	93	PA	SANTARÉM	14
8172	38	PA	TAILÂNDIA	32
7527	1,363	PA	ULIANÓPOLIS	456
7513	311	PA	ULIANÓPOLIS	265
7482	370	PA	ULIANÓPOLIS	221
7717	149	PA	ULIANÓPOLIS	149
7724	1,616	PA	ULIANÓPOLIS	99
7516	135	PA	ULIANÓPOLIS	96
7504	102	PA	ULIANÓPOLIS	80
7511	82	PA	ULIANÓPOLIS	76
7733	57	PA	ULIANÓPOLIS	32
7695	38	PA	ULIANÓPOLIS	27
7455	86	PA	ULIANÓPOLIS	22
7711	33	PA	ULIANÓPOLIS	20
7388	37	PA	ULIANÓPOLIS	7
TOTAL PARÁ STATE				10,133

8.3 Polygons with Soy in Rondônia State

ID	Area of Polygon (ha)	State	Municipality	Soy Area (ha)
4097	61	RO	ALTO PARAÍSO	42
3926	32	RO	ALTO PARAÍSO	8
357	213	RO	CABIXI	47
372	104	RO	CABIXI	39
334	42	RO	CABIXI	31
402	28	RO	CABIXI	7
668	83	RO	CORUMBIARA	79
619	35	RO	CORUMBIARA	35
431	900	RO	PIMENTEIRAS DO OESTE	696
421	389	RO	PIMENTEIRAS DO OESTE	359
422	151	RO	PIMENTEIRAS DO OESTE	147
404	65	RO	PIMENTEIRAS DO OESTE	63
315	40	RO	PIMENTEIRAS DO OESTE	37
400	91	RO	PIMENTEIRAS DO OESTE	34
4147	67	RO	RIO CRESPO	35
4106	26	RO	RIO CRESPO	6
781	306	RO	VILHENA	127
739	191	RO	VILHENA	115
916	34	RO	VILHENA	16
741	97	RO	VILHENA	7
TOTAL RONDÔNIA STATE				1,928

8.4 Polygons with Soy in Maranhão State

ID	Area of Polygon (ha)	State	Municipality	Soy Area (ha)
6778	335	MA	AÇAILÂNDIA	279
6789	137	MA	AÇAILÂNDIA	115
6998	108	MA	AÇAILÂNDIA	108
6890	104	MA	AÇAILÂNDIA	99
7074	183	MA	AÇAILÂNDIA	54
7048	83	MA	AÇAILÂNDIA	54
6915	67	MA	AÇAILÂNDIA	53
6719	59	MA	AÇAILÂNDIA	48
6763	46	MA	AÇAILÂNDIA	46
6884	57	MA	AÇAILÂNDIA	41
6917	46	MA	AÇAILÂNDIA	40
6798	46	MA	AÇAILÂNDIA	29
7010	31	MA	AÇAILÂNDIA	28
6796	27	MA	AÇAILÂNDIA	27
6717	73	MA	AÇAILÂNDIA	27
6980	26	MA	AÇAILÂNDIA	25
6821	30	MA	AÇAILÂNDIA	21
7075	27	MA	AÇAILÂNDIA	16
6896	99	MA	AÇAILÂNDIA	6
6833	510	MA	BURITICUPU	469
6838	226	MA	BURITICUPU	226
6818	107	MA	BURITICUPU	107
6986	189	MA	BURITICUPU	74
6981	79	MA	BURITICUPU	72
6849	97	MA	BURITICUPU	63
6988	61	MA	BURITICUPU	54
6797	49	MA	BURITICUPU	49
6994	51	MA	BURITICUPU	47
7020	70	MA	BURITICUPU	42
6950	33	MA	BURITICUPU	33
6812	32	MA	BURITICUPU	32
6967	34	MA	BURITICUPU	28
7011	33	MA	BURITICUPU	23
6805	29	MA	BURITICUPU	20
7059	538	MA	ITINGA DO MARANHÃO	407
7381	377	MA	ITINGA DO MARANHÃO	82
7174	75	MA	ITINGA DO MARANHÃO	69
7154	59	MA	ITINGA DO MARANHÃO	53
7153	33	MA	ITINGA DO MARANHÃO	33
7193	294	MA	ITINGA DO MARANHÃO	23

ID	Area of Polygon (ha)	State	Municipality	Soy Area (ha)
7142	56	MA	ITINGA DO MARANHÃO	18
7165	42	MA	ITINGA DO MARANHÃO	16
7211	39	MA	ITINGA DO MARANHÃO	5
TOTAL MARANHÃO STATE				3,160

8.5 Polygons with Soy in Amapá State

ID	Area of Polygon (ha)	State	Municipality	Soy Area (ha)
8898	32	AP	MACAPÁ	29
8900	29	AP	MACAPÁ	29
TOTAL AMAPÁ STATE				58

8.6 Polygons with Soy in Roraima State

ID	Area of Polygon (ha)	State	Municipality	Soy Area (ha)
8930	26	RR	ALTO ALEGRE	23
TOTAL RORAIMA STATE				23

