

Understanding forest fires and burning in Apuí, Southern Amazonas state

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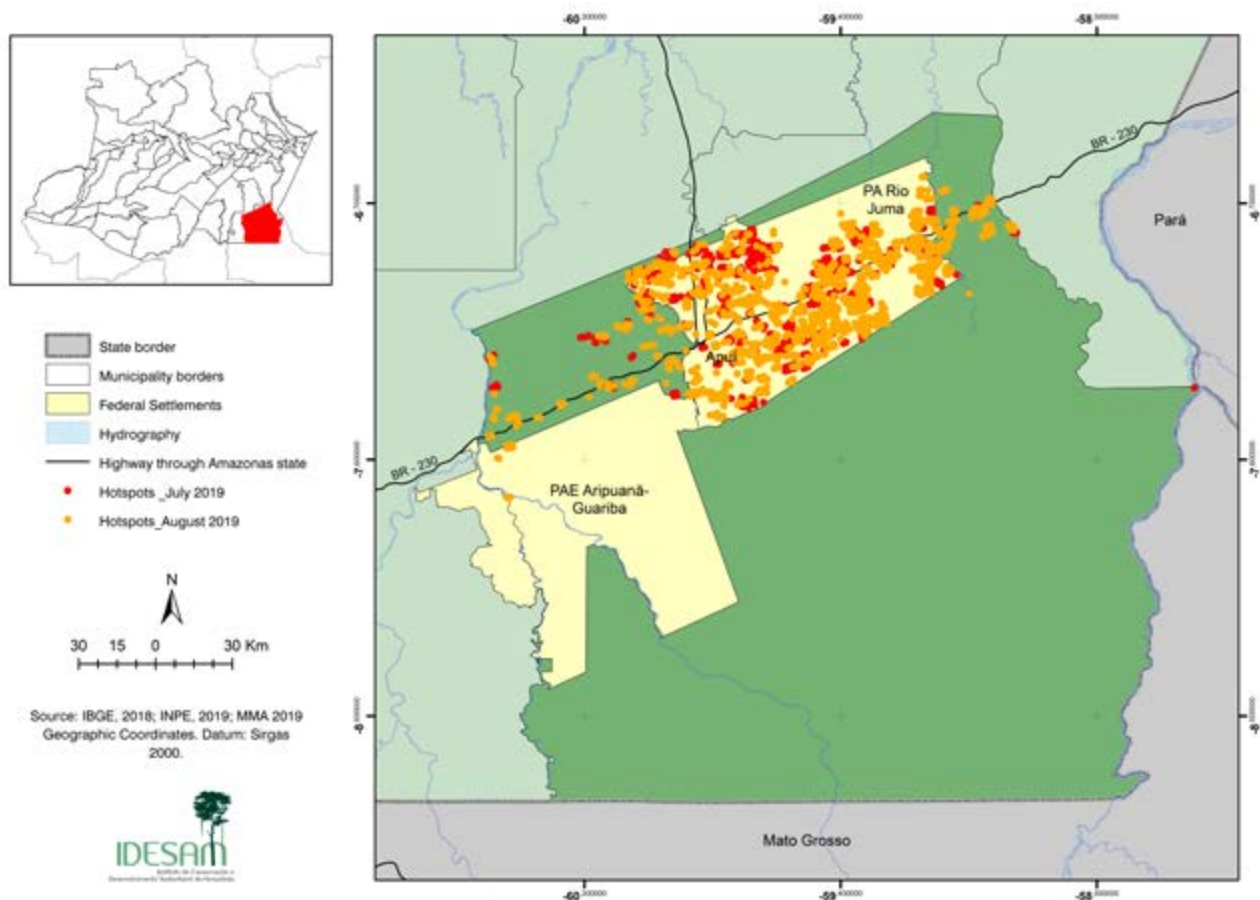
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The municipality of Apuí, located in the southern part of Amazonas state, along the Transamazon Highway (BR-230), is an agricultural expansion frontier in the Amazon, occupying the ninth position of the most deforested municipalities annually, since 2013. Its colonization began in 1982, with the creation of the Rio Juma Settlement Project (PA Rio Juma), which

houses the majority of the rural population, of the area in use, and consequently, of the current burning and fires (Figure 1). In this context, Idesam¹ prepared this technical note to provide technical support for an action proposal to reduce the impacts of this burning season, which has been affecting the municipality and Apuí and, especially, the PA Rio Juma.

FIGURE 1: Hotspots in the municipality of Apuí in July and August 2019.



¹ The Institute for Conservation and Sustainable Development of the Amazon is based in Manaus/Amazonas, and has been working for more than 10 years in Apuí, developing innovative activities related to sustainable rural production and strengthening of local governance systems: idesam.org

First, we present the definitions of the types of burnings and fires, and then evaluate the change in the number of hotspots between July and August 2018 and 2019, comparing the municipality with the state of Amazonas and the Amazon as a whole.

We can classify events with fire in rural areas as *burnings* or *fires* (in Portuguese, “queimadas” and “incêndios”, respectively). *Burnings* are a practice used in forestry and agriculture where fire is used in a controlled manner and can be used for production. In rural areas of the Amazon, burning is used to “clear” pastures and areas for agriculture. In all cases, the goal is to eliminate secondary regeneration of forest species while ashes provide a quick nutrient input for the plantations. Burning is also used after clearing an area for the same purpose. *Fires*, on the other hand, occur when uncontrolled fire strikes any form of vegetation (whether caused by natural or human sources).

Wildfires in the Amazon invade both areas of agriculture and mature and secondary forests, causing damage to the flora and fauna of the region.

We used data from the National Space Research Institute (INPE) Fire Program² for July and August (beginning of the burning season) 2018 and 2019 to evaluate the differences in the number of hotspots in Apuí. A hotspot data is obtained by satellites with sensors that capture (thermal) heat. The sensors can detect heat foci with at least 30mx1m in extension to several larger foci in an area of 1km². I.e., it tells you if there are hotspots within every 1km², but it does not report the size of the area burned. We complemented the analysis using Landsat 8 satellite imagery³ and INPE’s Real-Time Amazon Deforestation (DETER⁴) data to identify fire outbreaks that occurred in agricultural, forested, and newly deforested areas⁵.



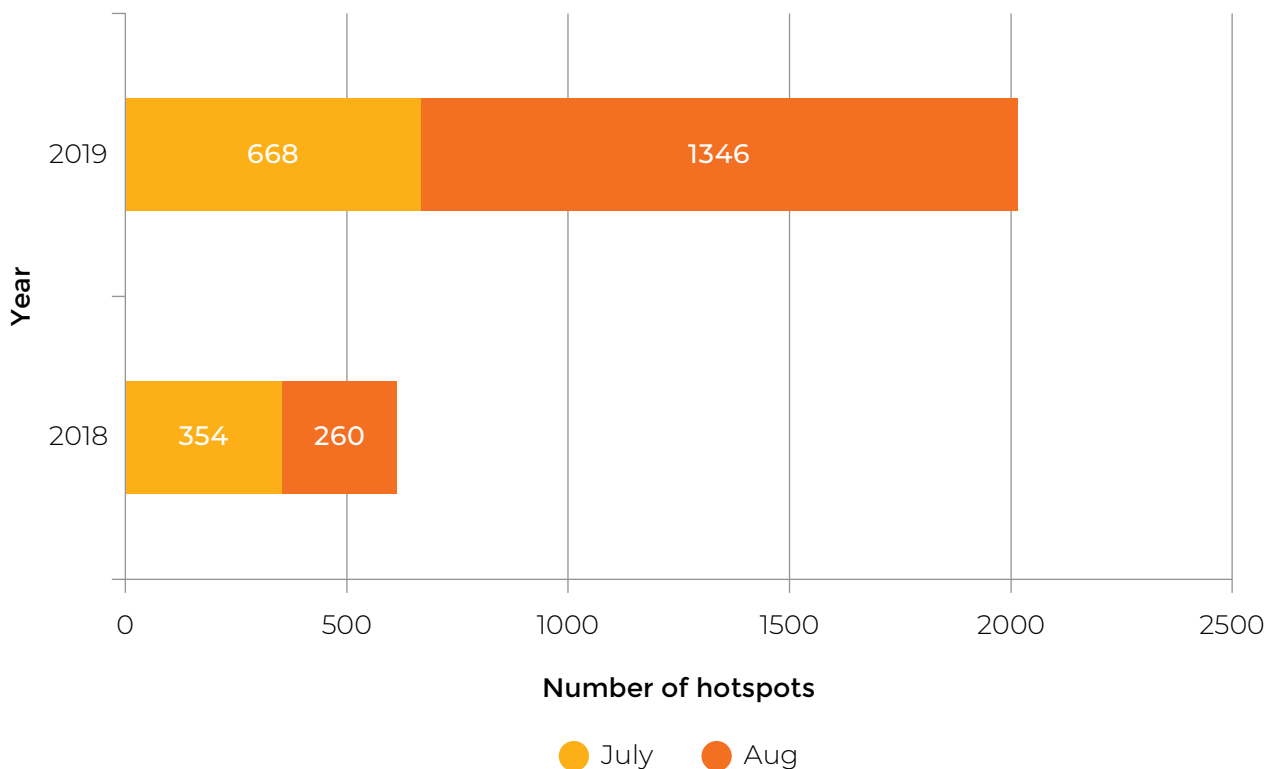
² Inpe – Fire Program: <http://queimadas.dgi.inpe.br/queimadas/bdqueimadas>. Accessed on Sept. 3rd, 2019.

³ USGS – EarthExplorer. <https://earthexplorer.usgs.gov/>. Accessed on Aug. 27, 2019.

⁴ INPE – DETER Program. Terra Brasilis platform: <http://terrabilis.dpi.inpe.br>. Accessed on Sept. 3rd, 2019.

⁵ The MODIS hotspot sensor data represents a 1km² pixel. We used the program’s shapefile overlapped with the Landsat 8 satellite image (RGB: 654) and DETER data to visually identify where the point fell. The results of this analysis should be considered with caution and as an indication only. There is little precision in associating this information, as the spatial resolution of the hotspot data is very low (1km²) when compared to the Landsat 8 and DETER (30m²) products from which we obtained the types of vegetation cover. Nonetheless, we find it valid to present the data, since the rural areas with agriculture are the hardest hit by the fire outbreaks, as shown in figure 1.

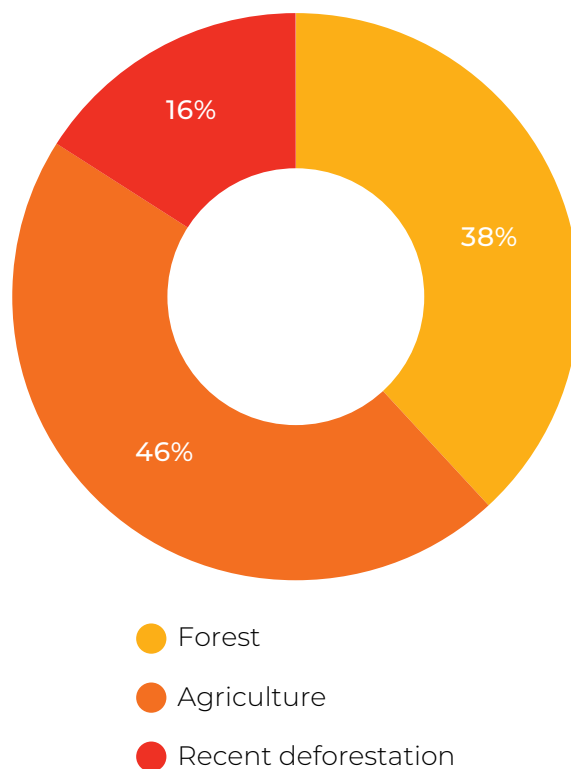
FIGURE 2: Hotspots in July and August 2019.



The results show that Apuí had a significant increase in the number of hotspots in July and August 2019 compared to the same period in 2018 (Figure 2). There was an increase of 89% for July and 418% for August in the number of fire outbreaks in Apuí in 2019, compared to the same period in 2018, 2.6 times more than in Amazonas state (2% and 158%) and in the Amazon (13% and 161%), respectively. The number of outbreaks accumulated in Apuí in these two months of 2019 represented 25% of the total of outbreaks in the Amazon. The PA Rio Juma alone concentrated 84% of the hotspots of Apuí and represented 21% of the total for the Amazon.

The agricultural areas of Apuí, especially pastures, had the highest incidence (46%) of the hotspots observed in the accumulated July-August, followed by forest areas (38%) and deforested areas (16%). PA Rio Juma followed the same trend, with 47%, 36% and 17%, respectively. In areas outside the PA Rio Juma, the largest amount of hotspots occurred in forests (49%), followed by agriculture (42%) and deforested areas in 2019 (9%).

FIGURE 3: Hotspots accumulated classified by land use in Apuí in July and August 2019.





RECOMMENDATIONS

Given this scenario and considering that we are just at the beginning of the dry season (usually from July to November) in 2019, it is important to take immediate and emergency action to prevent a complete lack of control of the burning and fires in the region. We suggest that actions need to be promoted on four fronts:

1. **“Create Strategic Intelligence”** about deforestation and burning in Apuí: conduct a more robust analysis combining data from geographic information systems and remote sensing (i.e. PRODES, DETER, NOAA, MAPBIOMAS) with intelligence from local teams and partners to understand the fire dynamics in Apuí differentiating areas of forest deforestation, pasture clearing and occurrence of understory fires that invade the forest. This analysis will also try to identify which actors (or groups of actors) are responsible for this recent increase in burnings in the municipality.
2. **“Situation Room”** for the construction of an emergency forest fire prevention and control plan: this plan should involve the participation of the main sectors involved (state government, city hall, local associations and unions, etc.) and generate products and materials to promote fire prevention and replace the use of fire for pasture cleaning in 2018/2019 with support for the fire brigade to fight forest fires and establish firebreaks.
3. **“Putting Out the Fire”** - fire brigades and support for the city hall: foster the engagement of local society by training and sensitizing producers; equip the local fire brigade of the city to ensure fire prevention and firefighting with rapid response at critical times, reduce environmental and economic damage, and hold individuals accountable. Deadline for implementation: 2-4 months
4. **“Recovering the damage”** - positive agenda for restoring sustainable production: tree planting and forest restoration in strategic areas by planting agroforestry and silvopastoral systems showing that it is possible to reconcile agricultural and forestry production with the conservation of native forests. Deadline for implementation: 6-12 months