

## The Expansion of Unofficial Roads in the Brazilian Amazon

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Unofficial roads are defining a new dynamic of occupation in the Amazon. Local actors (mainly loggers) have built thousands of kilometers of these roads on public lands, generating serious environmental and socioeconomic impacts. In 2001, unofficial roads totaled 20,796 kilometers in the central-west of the state of Pará. The opening of these roads frequently facilitates land fraud, deforestation, predatory logging, and an increase in land tenure conflicts. In this issue of *The State of the Amazon*, we present results from mapping of unofficial roads in the central-west of Pará and suggest increasing such mapping to cover the Brazilian Amazon as a whole. To mitigate the negative impacts associated with the unofficial roads, we recommend the following measures: (i) prioritizing enforcement in the most critical road locations; (ii) establishment of new protected areas; and (iii) land titling.

### Unofficial Roads

Unofficial roads are built on public lands, usually by private economic interests. Logging activity has a central role in the opening of these roads.<sup>1</sup> Thousand of kilometers of unofficial roads are being opened in forested areas, usually without planning or the required legal authorization.<sup>2</sup> In some cases municipal governments take over these roads, which then increase local infrastructure and bring broad socioeconomic benefits. Nevertheless, the uncontrolled expansion of unofficial roads catalyzes predatory logging and land speculation, in addition to contributing to subsequent increase of fire and deforestation.<sup>3</sup>

### Central-west of the State of Pará

In this case study, we focus on the central-west of Pará, an area of 546,000 km<sup>2</sup> (44% of the state) with a population of approximately 1.1 million habitants in 2000 (17% of the state).<sup>4</sup> Most of this region is covered by intact forests, and protected areas occupy 40% of its total area. The central part of the region has a large area of undesignated public lands, known as “Terra do Meio” (Midlands), where various land conflicts have been reported.<sup>3</sup> Deforestation of the central-west of Pará has increased rapidly in recent years, promoted by the expansion of intensive cattle ranching and agriculture.

The timber sector in the region has grown substantially, and today it logging emanates from five large wood processing centers: Santarém, Itaituba, Novo Progresso, Altamira and Uruará.<sup>5</sup>

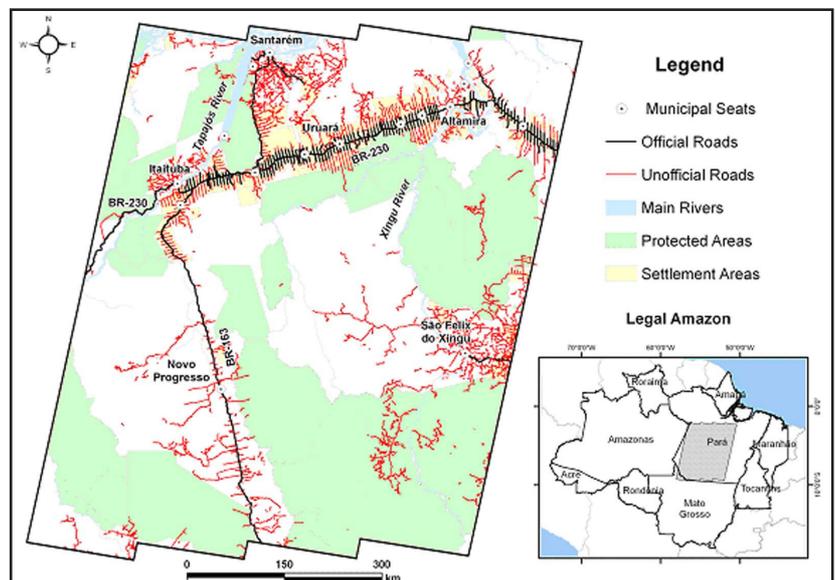
This region has a notable concentration of unofficial roads. Three factors stimulate the opening of these roads. First, the abundance of forests attracts loggers. Second, the existence of large undesignated public areas motivates spontaneous land occupation. Finally, the prospective paving of the BR-163 highway (Cuiabá-Santarém) has catalyzed a race to control the region’s natural resources.

### Expansion of Unofficial Roads

Until 1990, unofficial roads amounted to 5,042 km in the central-west of Pará. In 1995, these roads increased to 8,679 km and, in 2001, they already reached 20,796 km, representing 82% of the existing roads (table 1). Whereas straight roads along the Transamazon Highway correspond to branch roads for colonization, the irregular road pattern near São Félix do Xingu and Novo Progresso is characteristic of logging and mining activities, respectively (figure 1).

The largest unofficial road, about 215 kilometers long, is located in the central part of the region, between the Xingu River and the BR-163 highway. This road allows access to extensive areas of intact forest. The “Rodovia do Ouro” (Golden Road) is located in the far southwest (near Novo Progresso), and extends

Figure 1. Unofficial Roads in the Central-West of Pará, in 2001.



about 180 kilometers from the BR-163 to the state of Amazonas. This road was built by miners in the 1980s to permit access to gold mines of the Tapajós Basin.<sup>6</sup>

The average rate of expansion of unofficial roads almost doubled in ten years, from 9.85 km/10,000 km<sup>2</sup> per year during 1990-95, to 19.25 km/10,000 km<sup>2</sup> per year during 1996-2001. In 2001, this expansion was even more significant in the municipalities of Santarém (57.22 km/10,000 km<sup>2</sup>) and São Félix do Xingu (73.24 km/10,000 km<sup>2</sup>), as well as in the southern part of the municipality of Novo Progresso near the BR-163 (39.34 km/10,000 km<sup>2</sup>).

**Table 1. Evolution of Unofficial Roads in the Central-West of Pará**

Period	<1990	1991-95	1996-2001
Increment (Km/10,000 km <sup>2</sup> /period)	-	3,637	12,090
Total Extension (Km/10,000 km <sup>2</sup> )	5,042	8,679	20,769

### Unofficial Roads in Protected Areas

The presence of protected areas<sup>7</sup> has restrained, but not stopped, the expansion of unofficial roads. In fact, the growth rate of these roads is two to three times lower within protected areas than outside protected areas. However, unofficial roads have expanded into the Menkragnoti, Kayapó, Trincheira Bacajá and Apyterewa indigenous lands (near São Félix do Xingu), and into other protected areas such as the Tapajós National Forest and the Arapiuns Extractive Reserve (near Santarém). We observed a pattern of irregular roads on indigenous lands, indicating illegal logging operations in these areas. In addition to expanding into protected areas, unofficial roads are penetrating large forest blocks potentially suitable for the establishment of future protected areas, such as to the West of São Félix do Xingu.

### Implications for Public Policies

The process of expansion of unofficial roads proceeds without precise information about their location, extension and rates of expansion. We propose a new method to monitor unofficial roads in the Amazon region based on satellite images.<sup>8</sup> With little investment, this monitoring could be expanded to other areas in the Brazilian Amazon. According to Imazon's estimates, the monitoring of all the regions where unofficial roads are most concentrated would require approximately 100 person-days per monitoring period. The National Institute for Space Research (Inpe) makes the satellite images and adequate software to analyze the images (SPRING) freely available.<sup>9</sup>

The information generated by monitoring unofficial roads could guide three measures to strengthen the role of government in regulating frontiers in the Amazon:

**Prioritizing Monitoring.** Identification of critical areas where the expansion of unofficial roads is concentrated and/or accelerated could help prioritize actions in these areas by relevant national agencies (for example, the Institute of the Environment and Renewable Natural Resources (Ibama) and the Public Ministry) and their state-level counterparts. Such prioritization would increase the efficiency of enforcement activities such as the confiscation of machinery and the imprisonment of violators.

**Establishment of Protected Areas.** Location of unofficial roads could provide a criterion for prioritizing the establishment of protected areas as a preventive measure. As this study demonstrates, unofficial roads expand less rapidly in protected areas.

**Regulation of Land Access.** Monitoring of unofficial roads would identify priority areas where Inbra (the National Institute for Colonization and Agrarian Reform) and state land agencies should accelerate land titling. This measure could contribute to reducing social conflicts along new or future frontiers in the Brazilian Amazon.

### References and Notes

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<sup>1</sup> In addition to loggers, others agents such as miners, farmers and ranchers also build unofficial roads and/or frequently benefit from them.

<sup>2</sup> Brazilian policies require that road construction be preceded by previous studies of environmental impacts (Conama - National Council for the Environment - 01/86) and should obtain previous permission for installation and operation (Conama 237/97). Failing to meet these norms should result in punishment according to the Environmental Crimes Law 9.605/98.

<sup>3</sup> Relatório Brasileiro sobre Direitos Humanos, Econômicos, Sociais e Culturais (2003): [http://www.rits.org.br/rets/download/emdestaque\\_040403.zip](http://www.rits.org.br/rets/download/emdestaque_040403.zip)

<sup>4</sup> IBGE. Censo Demográfico 2000. [www.ibge.gov.br](http://www.ibge.gov.br)

<sup>5</sup> Veríssimo, A., E. Lima & M. Lentini. 2002. Pólos madeireiros do Estado do Pará. Imazon, Belém, Brazil. 72 p.

<sup>6</sup> Bezerra, O., A. Veríssimo & C. Uhl. 1996. The regional impacts of small-scale gold mining in Amazônia. Natural Resources Forum 20: 305-317.

<sup>7</sup> Protected areas refer to indigenous lands, conservation units and military areas.

<sup>8</sup> We used Arcview 3.2 software to map unofficial roads within 20 Landsat satellite scenes from three periods (1985-90, 1991-95 and 1996-2001). To distinguish unofficial from official roads, we used IBGE's 1999 road map. We digitized all the roads in the scenes of the first period at a scale of 1:50,000. Subsequently, the increment of the unofficial roads was digitized for the 1991-95 and 1996-2001 periods.

<sup>9</sup> Inpe's website - <http://www.obt.inpe.br/prodes/> provides free satellite images; the software (SPRING) to analyze them is available at <http://www.dpi.inpe.br/spring/>. The research, on which this issue of *The State of the Amazon* is based, was funded by the Bank ABN AMRO, through the World Resources Institute - Washington, D.C., and by the Ford Foundation. Veríssimo had support from the AVINA Foundation.