



## 4.5 Dealing with deforestation in the Brazilian Amazon

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### Introduction

The municipality of São Félix do Xingu is the size of Austria and has the largest cattle herd in Brazil. It also has one of the highest deforestation rates in the Amazon region, mostly due to pasture expansion. Nevertheless, large tracts of standing forest remain over 78% of its territory, and are distributed among private properties, rural settlements, protected forest, and indigenous areas. This array of land-use types makes it ideal to demonstrate the need for multiple approaches and partnerships to tackle deforestation in the Amazon. For the last eight years, The Nature Conservancy (TNC) has brought together key stakeholders to develop and implement complementary strategies for forest conservation and improving sustainable production and livelihoods. TNC is seeking to evolve from a command-and-control approach to a “green,” low-carbon development approach.

Although not without challenges, this joint effort is yielding results on different fronts. More than 80% of private holdings are now in the federal land registry system, creating accountability for deforestation and improving governance, and in

2016, the municipality was the first to create a low-carbon agriculture plan. In addition, the Field to Table project is demonstrating viable and innovative alternatives for livestock production without deforestation, and the Cocoa Forest Initiative is so successful that it became a model for the Restoration of Degraded Areas state programme.



MULTIPLE APPROACHES  
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### The context

The strategies in São Félix do Xingu build on initiatives with the potential to be disseminated across the Amazon. This is important, because whatever happens in the Amazon will affect far more than just the region. Brazil is the world’s seventh largest emitter of greenhouse gases — 30% of which are caused by deforestation — and the Amazon’s ecosystems harbour approximately 15% of global terrestrial biodiversity.

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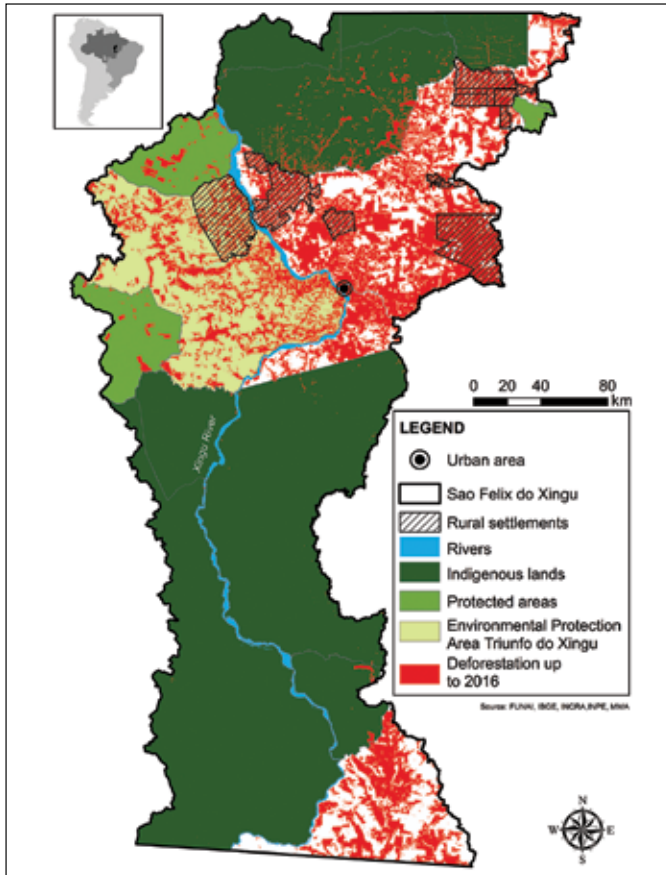
The sixth largest municipality in Brazil in area, São Félix do Xingu in the state of Pará (Figure 1). The municipality occupies 8.4 million hectares but has a population of only 111,633. Almost 60% is legally protected, with 4.5 million ha of indigenous lands and 1.6 million ha of protected areas. These lands play an important role in preventing the advance of deforestation, but they are not free from threats, especially illegal ranching and logging. The area most at risk is the 1.6 million-ha *Triunfo do Xingu* Environmental Protection Area; it is less strictly protected, since private use is allowed. In 2016, it accounted for 57% of all deforestation in the municipality, although it makes up only 19% of the land area. High rates of small-scale forest clearing are also seen in official land reform settlements. They occupy only 5% of the municipality but accounted for 25% of the deforested area in 2016.

With a cattle population that increased from 30,000 to 2.3 million between 1997 and 2013, São Félix do Xingu now has the largest municipal herd in Brazil. Although pasture expansion is more pronounced on medium to large properties, many small landholders also converted forest to pasture. Practised extensively and without proper management, cattle ranching typically forms only one part of a cycle that begins with deforestation and slash-and-burn and is followed by land degradation and abandonment, and the deforestation of new areas. By the time The Nature Conservancy started working in the area in 2009, the area was the symbol of a frontier out of control and among the first municipalities on the Brazilian government's "blacklist" of those with the highest deforestation rates. Inclusion in this list resulted in stricter federal oversight, and economic sanctions such as embargoes and reduced access to credit for farmers.



To find common ground for forest conservation and sustainable production in a region with a history of land conflicts and poor governance, TNC began an integrated, large-scale initiative involving diverse

actors working across many land-use types. Formal partnerships were established with the municipal and state governments, federal agencies, ranchers, slaughterhouses and beef retailers, smallholders and other critical local actors, such as the Alternative Cooperative of Small Rural and Urban Producers (CAPPRU), the Association for the Development of Family Agriculture of Alto Xingu, and the Rural Workers Union. To date, partnerships have focused on four main strategies: 1) compliance with environmental regulations; 2) improved livestock farming; 3) sustainable alternatives for smallholders; and 4) enhanced territorial and environmental management of indigenous land and protected areas. These strategies are synchronized with the state Green Municipalities Program, which aims to reduce deforestation and support sustainable agriculture and ranching, landscape planning and land titling. In addition, two other initiatives — cattle intensification and cocoa-based agroforestry — are inspiring Pará state to promote sustainable development in its 2030 strategic plan.

**Figure 1. São Felix do Xingu, Brazil**

Source: R.S. Vale, TNC

### Compliance with environmental regulations

Since 2009, TNC has helped local and state governments to fine-tune environmental management, compliance, control and monitoring models to increase the capacity of public agencies and the private sector to reduce deforestation and promote the rational use of natural resources. TNC's goal is to help bring rural properties and the beef supply chain into compliance with the Brazilian Forest Code. Under the Forest Code, 50–80% of all properties in the Amazon (the “legal reserve”), and all areas along watercourses, around springs and on steep slopes (“permanent preservation areas”), must be kept under native forest cover. If deforested, these areas need to be restored, or in the case of legal reserves deforested in excess prior to 2008, they can be offset. To strengthen environmental governance in support of this goal, TNC's actions have included the following initiatives.

### *Support for the rural environmental registry*

Demarcation and registration of farms and settlements within the federal *Cadastro Ambiental Rural* (CAR) is the first stage in meeting the requirements of the Forest Code, which involves mapping the border of all private land, permanent preservation areas and legal reserves. With financial support from the Amazon Fund of the Brazilian Development Bank, TNC mobilized land-owners and provided technical assistance, resulting in more than 80% of eligible land in São Félix do Xingu being registered. CAR is being used to link deforestation data with properties and property owners. This creates accountability, because even though Brazil has a very well-organized satellite-based deforestation monitoring system that covers the Amazon, without CAR it is nearly impossible to assign responsibility for areas with unclear or nonexistent land titles. CAR is also used by corporate commodity buyers to improve traceability in their supply chains.

### *Mapping and development of technical tools*

Using a combination of data from the CAR system, high-resolution digital land cover satellite images, hydrology and road maps, TNC has developed tools that enable detailed analysis of a farm's environmental condition, show how much land each farmer is legally required to restore, and indicates the optimal locations for productive land and protected forest. The tools also provide a robust foundation for the development and implementation of the Altered and Degraded Area Recovery Plan, as required by the Forest Code.

### *Support for the creation of the São Félix do Xingu Environmental Observatory*

This monitoring system was established to detect and investigate illegal deforestation throughout the municipality, involving training in GIS and remote sensing, logistical support, and provision of equipment and technical resources. The municipal government then hired the trained technicians to newly created permanent positions, a key factor in the sustainability of the observatory.

### *Facilitating the São Félix do Xingu Pact for the End of Illegal Deforestation*

This voluntary political commitment was made in 2011 by municipal, state, and federal government entities, producer organizations, community associations and NGOs. It includes a list of needs and actions to be prioritized in order to reduce deforestation and promote sustainable production.

### *Improving livestock farming*

In 2012, with support from the Moore Foundation, TNC launched the Field to Table project in partnership with the municipal farming union, the Marfrig Group (a company in the livestock sector), and the USA-based retailer Walmart. The aim was to establish a deforestation-free supply chain for beef. One component was developing a model for sustainable, low-carbon livestock intensification, based on the good agricultural practices program of the Brazilian Agricultural Research Corporation (EMBRAPA). The model was piloted on 13 farms occupying a total area of 40,000 ha, half under pasture (Garcia et al. 2017). Farmers received technical assistance on improved ranching practices and farm

business management, and degraded permanent preservation areas along watercourses were restored in compliance with the Forest Code.

Another component being developed is a monitoring system that integrates CAR, deforestation, and animal traceability information. Once farms are in the registry, meat buyers can track cattle back to their source farms, verify that suppliers are operating in deforestation-free areas, and exclude others from the market until they commit to restoration or other defined measures and ensure future environmental compliance. During the second phase of the project, starting in 2017, another 150 farms will be engaged, a voluntary protocol will be developed and an independent audit system will verify the origin of deforestation-free beef.

### Sustainable cocoa – a smallholder alternative

Looking for sustainable economic and food security alternatives for family farmers, TNC has been working since 2011 on the Cocoa Forest Initiative, with financial support from Cargill and the Norwegian Agency for Development Cooperation. This initiative promotes restoration of degraded pastures with cocoa-based agroforestry systems; the native cocoa forms the understorey below a canopy of timber, fruit and fuel trees. In addition to providing shade and microclimatic protection for young cocoa plants, trees produce goods, host pollinators and predators of cocoa pests, and contribute to increased biodiversity and carbon sequestration. Although constrained by high labour requirements, cocoa agroforests can also be an economically attractive option in complying with the Forest Code, which obliges land owners to reforest excess cleared land with native trees.

Following two years of preparation, the project began with 31 properties, mostly in official land reform settlements (Gomes et al. 2015). Today, 82 families are participating, each with an average of 4 hectares; projections estimate that by 2020, there will be 1,000 farms involved in cocoa-based agroforestry. Annual crops include cassava, maize and banana, which are grown as food crops before the cocoa starts to produce. Timber species represent the long-term investment that will motivate owners to maintain their land in forest cover. They include native mahogany (*Swietenia macrophylla*); this a timber tree, but farmers also prefer it due to the high market demand for its seeds. Copaiba (*Copaifera* spp.) and andiroba (*Carapa guianensis*) are both also planted and are commercially valuable for the extraction and sale of oil. The native acai palm (*Euterpe oleraceae*) can also be an early component of the system.

Participatory demonstration units are also being established, which are centres for dissemination and exchange of technical knowledge. Each unit is founded on a successful participant in the first phase, with the aim of attracting neighbouring farmers within a 15-km radius. This reduces logistical constraints in the provision of technical assistance and capacity building, and facilitates knowledge exchange and cooperation among small farmers, to foster gradual changes in perceptions and practices. The project took a multi-stakeholder approach, engaging grassroots organizations, government agencies and the private sector. An initial partnership was established with Cargill, CAPPRU, the São Félix Municipal Bureau of Agriculture, and the Ministry of Agriculture's Cocoa Research and

Technical Extension Agency. Due its success, the Cocoa Forest Initiative was used as a model for the state's restoration of degraded areas programme.

### Managing indigenous lands and protected areas

TNC works on two indigenous lands under a technical cooperation agreement with the Brazilian Indian Foundation to implement the National Policy of Environmental Management on Indigenous Lands, supported by the Amazon Fund. Management plans are being developed using tools that include life plans, monitoring plans, ethno-mapping and institutional strengthening, and will incorporate opportunities for generating sustainable income. One example is the collection of seeds and production of seedlings from high-value timber species, to be used in restoration projects throughout the municipality. Indigenous people are also being trained to monitor and protect the borders of their lands and the resources contained within them, to participate in state and municipal land-use planning and management processes, and to create a learning network to share experiences.

The Triunfo do Xingu Environmental Protected Area suffers from increasing deforestation and forest degradation, which are driven primarily by the expansion of inefficient ranching practices and worsened by the lack of resources to effectively enforce



boundaries. In partnership with the state and municipal environmental secretaries, TNC supported the formation of a management council and the development and implementation of the management plan. Farms located in this area will be a focus for the second phase of the Field to Table project.

### Remaining challenges

Reducing deforestation in the complex landscape of São Félix do Xingu presents multiple challenges.

Official data indicate that deforestation continues to

be among the highest in the Amazon, but it is not constant across the municipality.

A few CAR-registered private farms and official land reform settlements still have very high deforestation rates, but a significant proportion of deforestation is in the remaining unregistered land. In 2015, only ten farms — of more than 6,000 — were responsible for 15% of all deforestation in the municipality, and some had cleared at least 500 ha.

Given the investment required for forest clearance, there appears to be a belief in impunity from the consequences of such illegal actions. A solution will not depend solely on initiatives by NGOs or private companies. Effective law enforcement is clearly necessary, alongside complementary public policies that enable economic alternatives to deforestation, technical assistance and access to capital. Small-scale producers, particularly in official land reform settlements, ought to be the main beneficiaries.



Financial and capacity constraints may also have an impact. Effective implementation of activities under the Municipal Pact for the End of Illegal Deforestation is constrained by the fact that a fund to support it has not yet been launched. The municipality has limited capacity to implement actions across the entire area, which restricts the Environmental Observatory's operations and efficiency. Lack of land titling remains a barrier to obtaining credit, without which land-owners on more than 200,000 ha of previously deforested land will continue to be noncompliant with the Forest Code and will face exclusion from the responsible beef supply programme if they do not reforest mandated areas.

### Conclusions

The sustainable intensification of cattle ranching channels production into under-utilized areas that have already been deforested. In addition to avoiding future deforestation, there is a great opportunity to reforest and restore degraded lands in compliance with environmental laws, adding value to the entire supply chain. Diversifying income generation is essential to managing the risks of family farm production systems, and cocoa-based agroforestry presents a promising opportunity for restoration while strengthening food security among small-scale farmers in critical Amazon development frontiers.

Experiences in São Félix do Xingu suggest that preventing illegal deforestation requires approaches that are complementary to command-and-control, as well as active law enforcement. Effective national and state government policies and enforcement, combined with refined mapping and monitoring tools at the municipal and property levels, are essential in reducing high levels of deforestation. Positive incentives are also important. They include supporting alternatives to deforestation by increasing farm productivity and income while simultaneously reducing environmental impacts and ensuring the health of supporting ecosystems.

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