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> Lower deforestation rates in the Brazilian Amazon

Supporting farm forestry

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Since 2004, thanks to a monitoring and repression policy, deforestation in the Brazilian Amazon has decreased substantially. If this trend is to continue, smallholder farmers need support to enable them to take advantage of their forest resources and to develop ecologically intensive agricultural systems.

In the Brazilian Amazon, annual deforestation rates have been slowing since 2004: from 27 000 km², they fell to 4 650 km² in 2011-2012, which was close to the target set by the national climate change plan for 2020 of 3 900 km².

Until 2008, this reduction could be explained by declining global agricultural commodity prices, giving fewer incentives to clear land. But since then, rates have continued to slow in spite of the increase in prices, demonstrating the impact of the Plan of Action to Prevent and Control Deforestation in the Amazon, launched in 2004.

Control and protection

Under the Presidency of the Republic, this programme involves 13 ministries. Combating deforestation is becoming a national priority for the Presidency, and is no longer the sole responsibility of the Ministry of the Environment. The goal is to promote the sustainable development of the Amazon through three types of action: the monitoring, control and repression of deforestation; the allocation of land titles for land granted during the colonisation of the region; and the promotion and establishment of sustainable production systems.

Priority is given to control and repression operations. These operations are aided by the Brazilian National Institute for Space Research (INPE) satellite imaging surveillance system, which is being continuously improved: estimates were originally annual but are currently produced fortnightly thanks to the DETER (Deforestation Detection in Real Time) warning system. The government is now able to carry out better targeted, more frequent actions in areas with high deforestation rates and to enforce the Forest Code adopted in 1965. Numerous control

operations such as Arco de Fogo are being conducted, sometimes with the support of the army: closing sawmills, confiscating goods (logs, vehicles, tractors, chainsaws), and arresting offenders. In 2008, a red list was created: 36 municipalities appeared on it and were subject to stricter controls. Some then took measures in collaboration with the local authorities in order to be removed from the list. The regional dynamism generated by the creation of the "Green Municipalities" label was thus enhanced.

> In 2004, Brazil took measures to combat deforestation, and confirmed its protected areas policy.

In addition to this programme, the State confirmed its protected areas policy: an additional 487 000 km² of land were protected between 2003 and 2006. Today, these areas cover more than 2 million km², or 42% of the Brazilian Amazon, and provide areas of protection against deforestation.

Another key development took place in 2008, when public and private banks began to demand land tenure and environmental certificates from farmers wishing to obtain loans, thereby putting an end to the allocation of credit that encourages deforestation.

> Integrating forestry, farming and ranching in family farms.

Moreover, the Public Prosecutor's Office, distribution groups and environmental NGOs such as Greenpeace called for traceability in beef and soy supply chains, which are the main drivers of deforestation. In 2009, the Public Prosecutor's Office and the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) took legal action against 20 ranches and 11 slaughterhouses, and demanded that supermarket chains and the food industry stop buying from the offending slaughterhouses. The Brazilian supermarket association now requires its suppliers to provide a certificate of origin for meat. These actions have helped to reduce deforestation and to promote the adoption of sustainable practices, especially by the major landowners.

> Smallholder farmers are key actors in the preservation of the Amazon forest.

While companies and major landowners have the financial and technical capacities needed to adapt to stricter environmental requirements, the same cannot be said of smallholder farmers, who also play a key part in deforestation. Indeed, for more than 40 years, small settlers in the Amazon have been pursuing the same strategy: they clear the forest in order to grow food crops (maize, rice, manioc); after two or three years the soil loses its fertility and the land becomes unproductive. They then convert their plots into pastures, since ranching is the most profitable activity in the short term. And to meet their needs, they subsequently cut down more trees, clearing up to three hectares per year, which is the legal limit. If each of the 460 000 smallholder farming families cleared just one hectare of forest per year, the total would reach 4 600 km², exceeding the 3 900 km² target set for 2020. It is therefore vital that the smallholder farmers make their systems more productive and manage their soil fertility more effectively. This requires the creation of mixed forestry-farming-ranching systems that enhance natural forests at the same time as protecting them, and also increase agricultural productivity.

Promoting farm forestry...

The first part of this development is the promotion of farm forestry: by exploiting the timber and non-wood products in their forest, farmers can increase their income and supply the timber industry, thereby contributing to local development.

Smallholder farmers hold around 120 000 km² of natural forest, land that is declared a reserve under the Forest Code, which requires every farmer to maintain 50 to 80% of their property as a forest reserve. However, the Forest Code authorises logging providing a management plan has been approved by the competent local authorities. But the approval criteria are more suited to large-scale mechanised logging operations by specialised companies than to farm forestry, which is characterised by the following features: small areas, where logging is relatively unprofitable; low investment capacity compounded by the lack of forestry credit; and inadequate knowledge of logging and business management techniques. Smallholder farmers are thus forced to sell their standing trees, usually for a low price, to logging companies, most of which are illegal and use predatory logging techniques. These practices are detrimental not only to the farmers, who make little money from their forest reserve and bear the legal responsibility for this illegal trade, but also

to the forest ecosystem, whose regenerative capacity is compromised.

One way of developing farm forestry is to regulate the partnerships between farmers and logging companies. Defining rules and specifications guaranteeing the equity of contracts and the environmental sustainability of operations would create a favourable environment both for the development of farm forestry and for greater legal accountability of logging companies. Although annual income generated by farm forestry remains lower than that generated by agriculture, the amounts received by farmers after logging range from 5 000 to 30 000 dollars, depending on the volume of timber logged. The forest income generated could be invested in the development of ecologically intensive farming and ranching systems on land that has already been cleared, thereby helping to avoid further deforestation.

> **Partnerships between farmers and logging companies are a means of promoting farm forestry.**

This type of partnership would supplement the "autonomous" smallholder logging system (managed by farmers) promoted by the State. Although the "autonomous" system generates profits two to three times higher than partnership contracts, it is unlikely to become widespread due to its high cost, which highlights the importance of partnerships between farmers and logging companies.

However, in this type of partnership, which is similar to tenant farming, the company controls and executes the two phases of the development: pre-operation —inventory, drafting of the document estimating log volumes per species for the administrative authorisation—, and then logging. But the pre-operational phase is strategic in setting the conditions for sale, which have a considerable impact on the economic results of the development. The creation of appropriate forestry credit would enable farmers to control this phase and to negotiate sales contracts directly. They would then be in a better position to set the logging rules and to determine the annual cut areas and the species to be logged.

> **Public support is essential.**

It is therefore important to develop a forestry credit programme in order to finance the pre-operational phase. The amounts needed are on a par with the credit provided to family farms: 5 000 dollars for 60 hectares, the average area of a forest reserve for a family of smallholder farmers in the Amazon. One solution would be to mobilise existing public resources.

Developing farm forestry in this way implies providing training in different fields: forest dynamics; inventory and logging techniques; sales; and accounts, finance and contract management. Within the municipalities there are public organisations that provide technical assistance for smallholder farmers, and these could be in a position to set up credit projects. But they need to develop their expertise in the field of forestry by employing forest engineers and technicians.

... and sustainable agriculture

The second part of the development of family production systems in the Amazon is the maintenance of soil fertility and the ecological intensification of cleared land. It is, for example, possible to combine arboriculture (cacao, pepper, fruit trees, agroforestry systems), mechanised annual crops and ranching, and also to use conservation agriculture principles based on no-till farming and permanent cover crops. This method has been the subject of successful experiments, leading to the recovery of degraded soil and a threefold to fivefold increase in rice and maize yields. The producers associated with these experiments have confirmed their significance: by avoiding felling and burning, they make the work less arduous and dangerous; by increasing productivity they guarantee food security for the family and generate extra income through the sale of any output not consumed. In addition, they attract young people, who feel themselves to be at the heart of a process of modernisation and change.

To develop these ecologically intensive systems, public support is essential. Removing technical constraints —rationalising the use of fertilisers; controlling weed growth between harvests without using herbicides—, assessing the medium-term impact on soil fertility, and training farmers is the responsibility of research institutes and tech-

nical assistance organisations. Investing in material and inputs implies mobilising existing credit tools: PRONAF (support programme for family farming), municipality loans; and bank loans facilitated by compliance with environmental requirements and the Forest Code.

Taking advantage of the favourable conditions

The conditions are favourable for developing farm forestry and ecologically intensive agriculture, which play a part in forest preservation while improving small producers' living conditions and contributing to local development. Indeed, the role of mixed farming-ranching-forestry systems in preserving water, climate and ecological balances is recognised. Furthermore, family farmers, who are aware of the environmental damage caused by extensive systems, are willing to replace these with more sustainable systems. But in order to have a regional impact, these mixed systems need to be established over vast areas, which requires coordination by municipalities, banks and the public institutions that support smallholder farmers, as well as the organisation of producers into cooperatives or associations.

Although there is no longer any doubt about the agricultural potential of the Amazon after 40 years of colonisation, the preservation of the largest tropical forest in the world remains a challenge. A challenge that the third part of the Plan of Action to Prevent and Control Deforestation in the Amazon can address by providing the support needed for the development of farm forestry and sustainable family farming. <

A few words about...

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The findings have led to several publications, including:

Drigo I., Piketty M.-G., Pena W., Sist P., 2013. Long term economic viability of community-based forest management: A detailed analysis of two case studies in the Brazilian Amazon. Bois et forêts des tropiques, 315, 39-50.

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Assunção J., Gandour C., Rocha R., 2012. Deforestation Slowdown in the Legal Amazon: Prices or Policies? Climate Policy Initiative Working Paper-PUC Rio, 37.

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