Agroforestry policies for carbon, biodiversity and livelihoods:

Examples from Brazil

Götz Schroth

Associate Professor, Environmental Management

Federal University of Western Pará, Santarém, Brazil

Objectives of the presentation:

1. Present two case studies from Brazil where agroforestry generates triple benefits for climate, biodiversity and local livelihoods

2. Identify public policies that could strengthen this triple benefit role of agroforestry

These examples are from two of Brazil's and the world's most biodiversity-rich biomes:

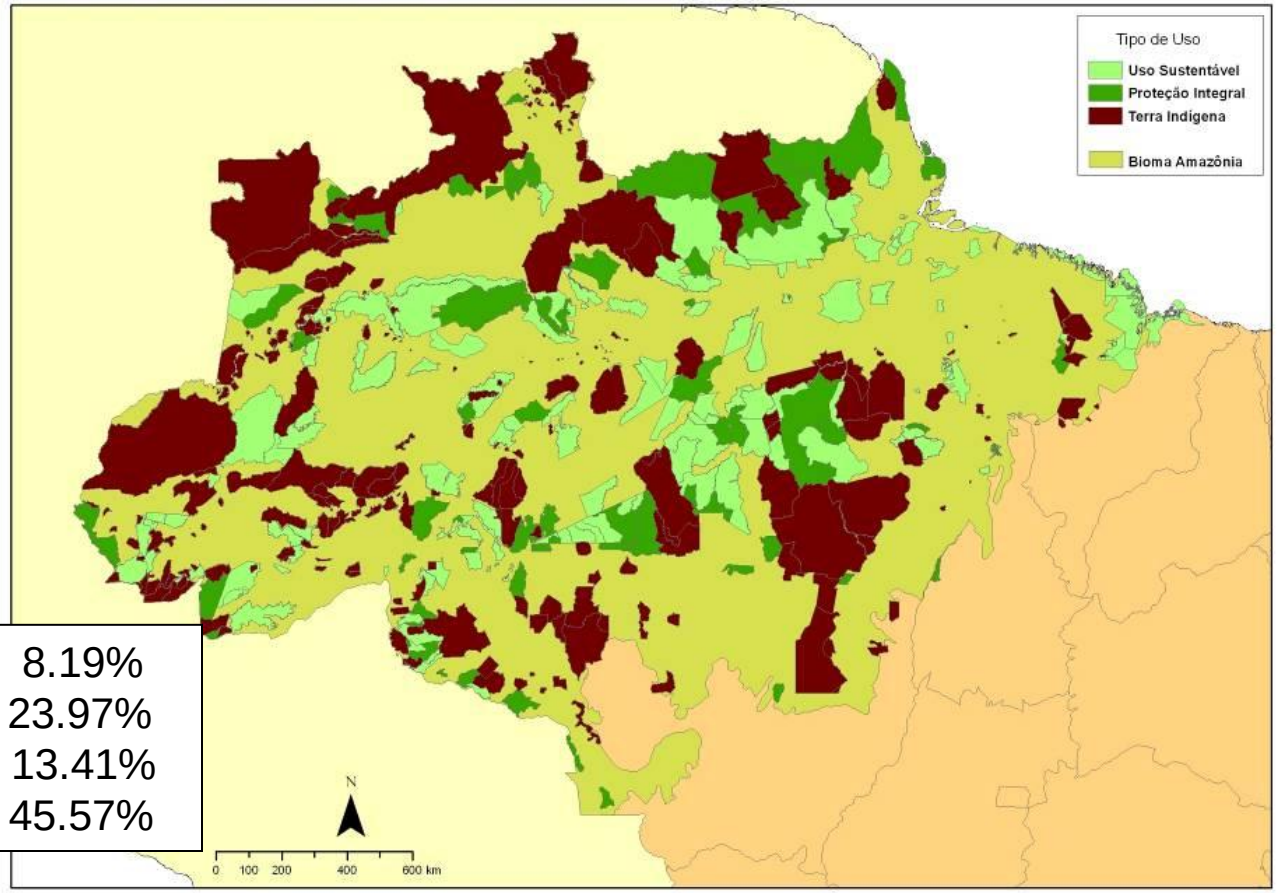
1. the Tapajós region in the central Amazon

2. southern Bahia in the Atlantic Forest Hotspot of biodiversity

Case study 1: the Tapajós region of the central Amazon, Brazil

Over a third of the Brazilian Amazon is within legally inhabited protected areas and new reserves of these categories continue to be created.

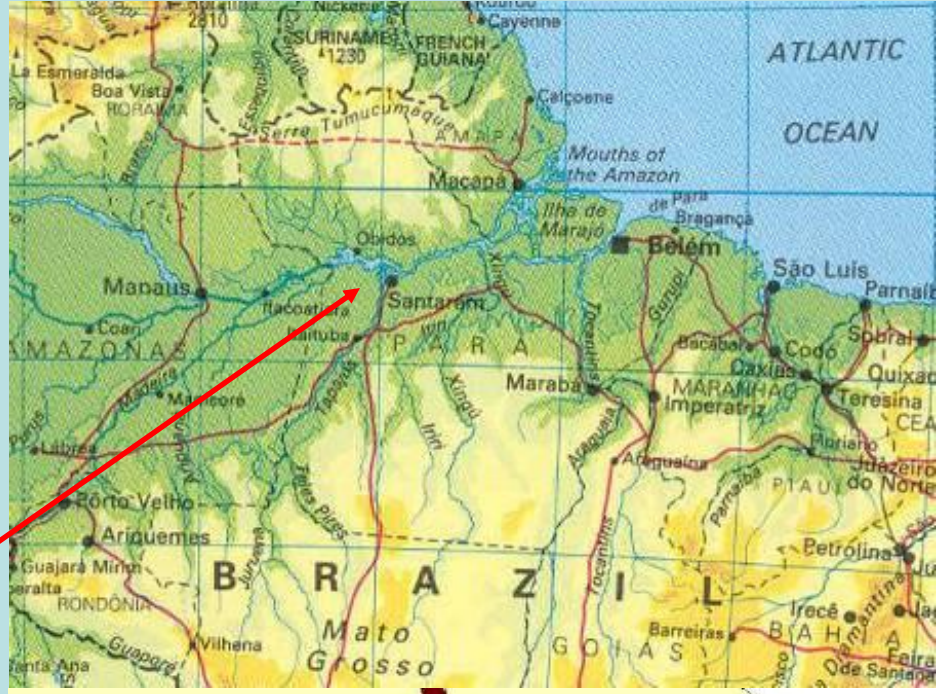
Together with strict protected areas and indigenous lands, these build important conservation corridors covering millions of hectares.

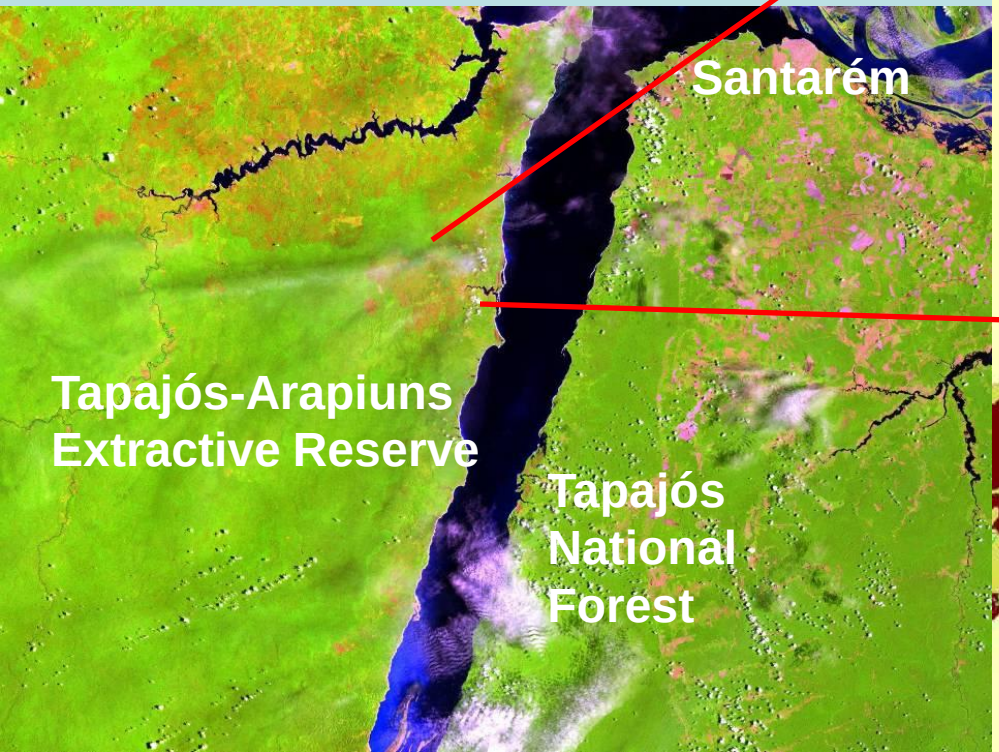


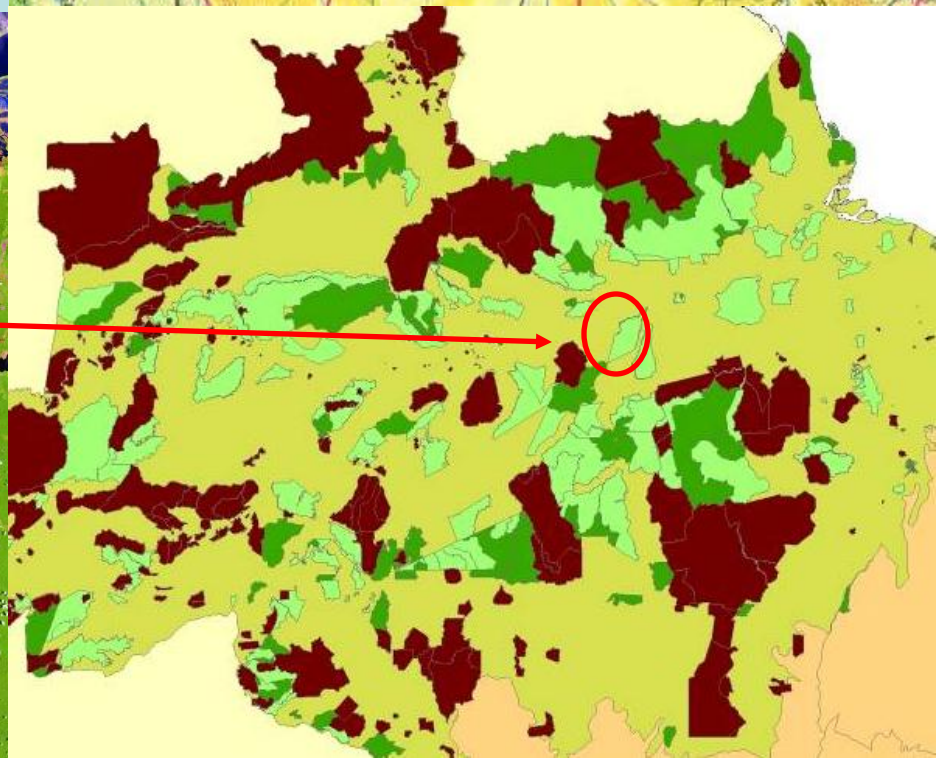
Strict protection (dark green)	8.19%
Indigenous lands (brown)	23.97%
Sustainable use (light green)	13.41%
Total	45.57%

Tapajós-Arapiuns Extractive Reserve

- 650k hectares, created in 1998
- located in a zone of high land use pressure close to the Santarém-Cuiabá highway (BR-163)
- With about 20,000 inhabitants in 70+ communities one of the most populous reserves in the Amazon







“**Extractive reserves**” are a form of **environmental service reward mechanism**, where the government provides secure land tenure to traditional communities in return for a commitment to environmental conservation.

Because of the low profitability of extractivism in species-rich tropical forest, the **economic and ecological viability** of extractive reserves has been questioned early on.

This criticism does not apply to all extractive reserves, because in some of these, the economic basis is **family agriculture and agro-forestry** rather than extractivism. Such is the case in the Tapajós-Arapiuns Extractive Reserve.

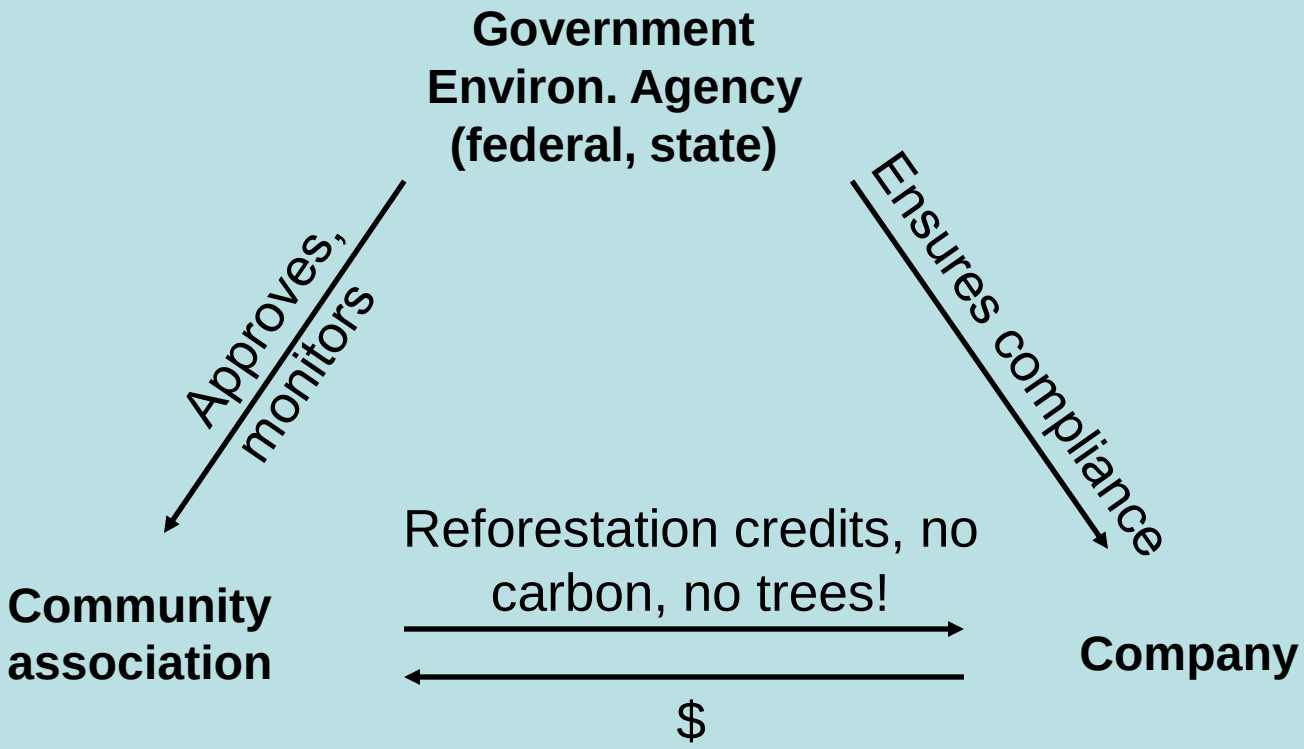
This solves one problem but creates another one: how to ensure that land use practices in these reserves are **environmentally and economically sustainable**.

Currently, this **sustainability is questionable**:

- The reserve inhabitants live mostly from **slash-and-burn agriculture** which is considered hard work and generates very little income
- There are many **deforested areas**
- Expansion of slash-and-burn agriculture into the **forested core area** of the reserve is a threat

A special feature of the Tapajós region is the century-old tradition of **planted rubber agroforests** that is almost dormant, although price increases and a government subsidy for rubber have recently revived the interest.

These rubber agroforests have served as a **model for a new type of agroforest** to supply an emerging market for reforestation credits.



In Brazil, the ***reposição florestal*** **("forest replacement")** legislation obliges companies that consume wood from unsustainable sources, including forest conversion, to either **plant** a corresponding number of trees or buy **reforestation credits** from someone who reforests on their behalf.

In 2005, five **communities** in the Tapajós-Arapiuns Extractive Reserve became accredited **providers of reforestation services** under this legislation, perhaps for the first time in an extractive reserve in Brazil, and started reforesting their fallow land and selling reforestation credits.

In a pilot project, about USD 15,000 in **credit sales generated income** in a community nursery and for the planters, who also laid a basis for a new type of **tree crop agroforests** and may have reduced their use of fire.

The approach was scaled up to 46 communities and over 300 families with a grant from the World Bank's Development Marketplace competition.

The project began to catalyze an “**agroforestry transition**” in the reserve. It could have done so at a larger scale and be replicated in other sustainable use protected areas throughout the Amazon.


AMBIENTE

Projeto agiliza créditos para operação de reflorestamento

ESPÉCIES

Unfortunately, in the course of the **decentralization** of the Brazilian forestry sector, the responsibility for the “*reposição florestal*” shifted from the federal to a state agency which now allows companies to offset wood consumption by paying a fee to the state government rather than buying credits. This effectively closed the credit market to the communities in the reserve.

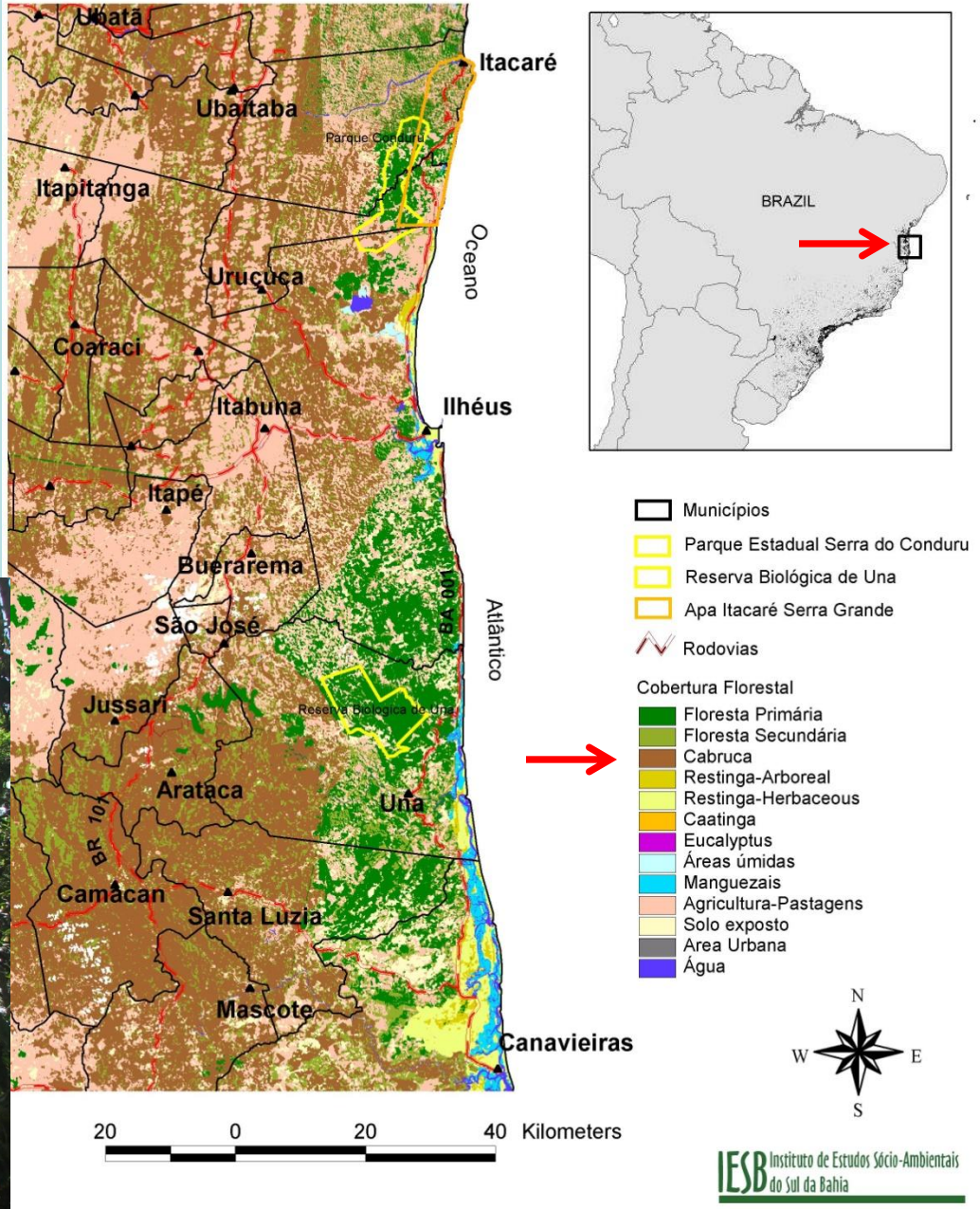
Reopening the reforestation credit market to these communities would **not require any change in legislation, but just a change in policy**. The benefits of the mechanism for stimulating sustainable agroforestry practices in this and other sustainable use reserves, and for communities in general, are readily recognized by government officials, but the policy change has not yet taken place.

Case study 2: the cocoa region of southern Bahia, Brazil

During much of the 20th century, Brazil was among the world's **leading cocoa producers**.

Although cocoa is native to the Amazon, most of this cocoa came from the northeastern state of **Bahia**, where it was grown under a native tree canopy in agroforests known as "**cabrucas**" which still widely dominate the landscape.

Cocoa region of Bahia, Brazil



Cabrucas are **highly biodiverse** with over 200 tree species and a number of endemic fauna species.

However, their **productivity is low** (250-300 kg/ha of cocoa), partly because of disease and partly because of socioeconomic problems, and some form of **intensification is necessary** for cocoa farming to survive in the region.

Presently, intensification usually means the application of a **package of practices** including the introduction of more disease-resistant cocoa varieties, sometimes crop diversification (rubber), more intensive management, and **reduction of the shade canopy**.

Based on a large number of tree inventories, a group of scientists recently estimated **the contribution of the cabrucas to the overall carbon stocks** in the vegetation of the cocoa region. According to these estimates:

- **Cabrucas** harbored on 48% of the tree-covered area 59% of the total above ground carbon stocks
- **Forests** harbored on 17% of the area 32% of the carbon stocks
- **Fallows** harbored on 35% of the area 9% of the carbon stocks

While undisturbed forests had on average about twice as much carbon per hectare (183 t/ha) as cabrucas (87 t/ha), the much larger extent of cabrucas meant that **most of the carbon in the landscape was stored in these agroforests**.

Moreover, while forests in that part of Brazil are now relatively secure, the much larger **carbon stocks in cabrucas are much more threatened**:

- While traditional cabrucas had on the average 87 t of C per hectare, intensified cabrucas had only 46 t of C per hectare (**47% C loss upon intensification**)
- If all cabrucas in the region were intensified in this same manner, this would result in the **release of the equivalent of 75% of the carbon contained in all natural forests of the region**

?

In order to avoid the progressive loss of a large percentage of the carbon stocks in the forested landscape of southern Bahia**, targeted incentives for conserving on-farm carbon stocks** need to be created. By necessity, these have to include the cabrucas that contain most – and the most threatened – carbon in the landscape.

The objective of such policies cannot be to prevent intensification of the cabrucas, which is necessary, but to encourage "**climate-smart intensification**". Fortunately, there is such a possibility:

The study also showed that in cabrucas – as in native forest – most of the carbon is stored in a relatively small number of large trees, while the many small trees that interfere most with the cocoa contain a relatively small percentage of the total carbon stocks*. The **conservation of the largest trees** must therefore become part of the technical recommendations for the intensification of cabrucas.

*The largest 30% of the trees >10 cm dbh were responsible for 72% of the aboveground carbon stocks, while the smallest 50% of the trees were responsible for only 9% of the carbon stocks.

The federal Parliament of Brazil is currently in the process of creating a "**green label**" for cocoa from cabrucas in order to help protect these traditional agroforests and their environmental and cultural services. Depending on the specifications of "cabruca" that will be used in this label (and that remain to be defined), this process could also contribute to protecting the landscape carbon stocks of the cocoa region of southern Bahia.

Conclusions:

Agroforestry has a significant potential to generate **triple benefits for climate, biodiversity and local livelihoods**. To what extent this potential is realized often depends on **public policies**.

Mandatory offsets for unsustainable use of timber and fuelwood through reforestation credit markets could be a very convenient mechanism for stimulating and subsidizing an "**agroforestry transition**" in slash-and-burn dependent communities and much easier to implement than carbon markets, but specific policies need to ensure that these markets are **accessible to communities**.

In long-established agricultural regions where forests have been reduced to fragments, agroforests can play a **fundamental role for biodiversity conservation and carbon storage**. This role needs to be recognized and **targeted incentives and mechanisms** need to be created for its conservation that need to be compatible with **land use intensification**.

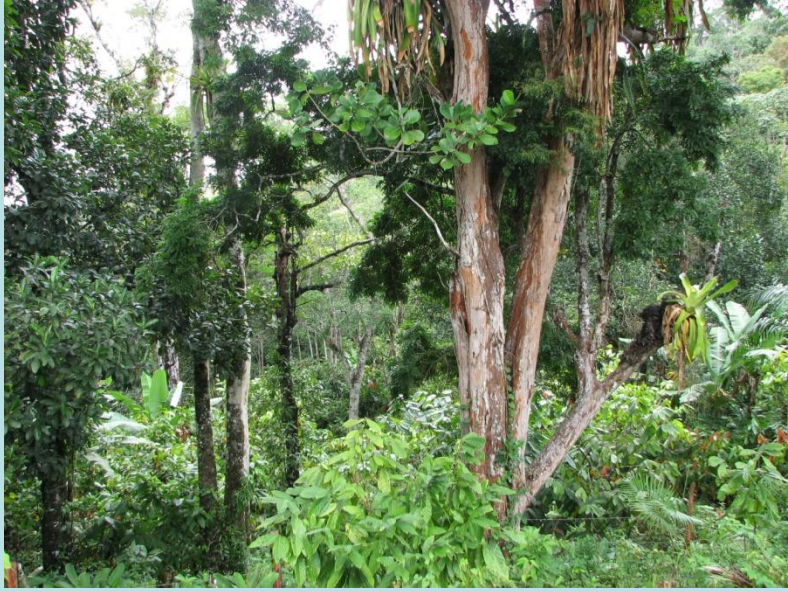
Acknowledgements

To the Tapajós case study contributed:

- Maria do Socorro da Mota, Santarém

To the Bahia case study contributed:

- Lucio Bede, Conservation International, Belo Horizonte
- Artur Paiva, Conservation International, Brasília
- Camila Cassano, State University of Santa Cruz and Instituto Socioambiental do Sul da Bahia, Ilhéus
- André Amorim, State University of Santa Cruz and CEPLAC, Ilhéus
- Deborah Faria, State University of Santa Cruz, Ilhéus
- Eduardo Mariano-Neto, Federal University of Bahia, Salvador
- Adriana Martini, University of São Paulo
- Regina Sambuichi, Institute of Applied Economic Research, Brasília
- Renato Lôbo, Brasília
- Leonardo Oliveira, University of Rio de Janeiro
- Jacques Delabie, State University of Santa Cruz and CEPLAC, Ilhéus




Thanks!