Alarm in the Amazon

While nature conservationists try to stem human infiltration of the rainforest, other NGOs and businesses are working on developing a sustainable forest economy in the Amazon. Albert Sikkema saw this on a visit to the Amazon region to talk to Brazilian scientists about the recent forest fires and the ongoing deforestation.

text Albert Sikkema *photos* Albert Sikkema and Maryane Andrade

Manaus is a metropolis with 2.5 million inhabitants in the middle of the Amazon region. Late afternoon, there are long traffic jams throughout the city; my taxi driver winds his way through the labyrinth of bumpy motorways and handy back streets, but the traffic comes to a standstill there too. And yet within half an hour's drive or boat trip on the Amazon river, you find yourself in the middle of the rainforest. The immense Amazon forest stretches for hundreds of kilometres in all directions around Manaus. But how long will this be the case?

Maryane Andrade, a Master's student at the University of São Paulo, is doing research with the National Institute of Amazonian Research (INPA) in Manaus on Highway 319. This is a dirt road that runs for nearly 900 kilometres between Manaus and Rondônia, where very little forest has been left standing. Andrade wants to know whether this road, seen from the air just a thin brown strip through endless green, gives landless farmers and agro businesses a stepping stone to colonizing the rainforest.

The road crosses an area of unique biodiversity between two great rivers, says Andrade. Many Indian tribes live on the banks of these rivers. The previous government decided to designate part of this river basin a reserve where deforestation and mining would be banned, but Jair Bolsonaro's new government wants to tar the road. That will cost about 1.5 billion dollars, which the government does not have as Brazil is in an economic crisis. But Andrade has no doubt that the road will be tarred one day.

SPREADING DEFORESTATION

Her research is not without its dangers; she is studying illegal tree felling along the road. Every 50 kilometres, she measures the amount of biomass in the forest. Although the research is still going on, the Master's student has noticed that deforestation is spreading from the south, where many valuable trees have already been felled for timber. Once there are no commercially interesting trees left, and there is a lot of dead wood lying in the forest, tracts of land are set alight in the dry season. In Rondônia, where Highway 319 starts, there were a lot of forest fires last summer.

Is this road a stepping stone to colonizing the rainforest?

During her research, Andrade saw who was organizing the illegal land-grabbing in the forest. She met traders who sell tracts of forest to small farmers with forged ownership documents. These 'grileiros' were offering one hectare of land for just 20 Brazilian real (less than five euros). The buyers fell all the trees of species with expensive wood on their plots and use their earnings to con-

FOREST FIRES: WORSE THAN EVER?

Were the forest fires of last August really as bad as the media made them out to be? There is a debate going on about that among Brazilian researchers. According to the INPA researchers Lucas Ferrante and Philip Fearnside, the fires and deforestation doubled last year, and President Bolsonaro is a danger to the environment, the traditional inhabitants of the Amazon, and the global climate. They cite space organization INPE, which published figures on the fires. As 'thanks', the government fired the director of the INPE.

But other researchers tone down the alarmist reports. According to Bruce Nelson, also of the INPA, the INPE works with two satellite systems. The second system – fast but imprecise – serves to warn about where illegal tree-felling is going on. This is the source of his colleagues' claim of a doubling of the fires. Only when the figures from the first system – precise but slow – have been evaluated, will we know if they are right, says GIS researcher Nelson. One thing that is certainly true, he says, is that the environmental service has had its budget cut by 30 per cent this year and hardly has any money for the work of detecting illegal logging.

Researcher Alessandro Araujo of the agricultural institute Embrapa puts the alarmist figures on the forest fires in perspective too. They may have been high in August, says Araujo, but in October – after Bolsonaro deployed the police – the area of forest was burned was the smallest in years. He too bases this assertion on INPE figures. According to Nelson and Araujo, we shall only know at the beginning of next year by exactly how much the fires and the deforestation increased.

▲ In Maryane Andrade's deforestation research, she measures the amount of biomass in the forest every 50 kilometres.

tinue exploiting the plot. The Brazilian government is oblivious to what is going on, because this first phase of deforestation cannot be seen by satellite and the environmental service does not have the human resources to monitor it.

The large-scale deforestation is already leading to climate change in the Amazon

CLIMATE CHANGE

On the advice of Bart Kruijt, the Wageningen climate researcher who has been doing research in the Amazon for 25 years, I also visited the Amazon-Face project, in which INPA and WUR are studying the effect of climate change on the growth of the rainforest. The research station lies 100 kilometres north of the busy city of Manaus, in the middle of the rainforest. INPA has built two 40-metre-high towers there, full of equipment for measuring the diameter, photosynthesis and respiration of the trees, as well as CO_2 levels and root growth. INPA has also built eight 'Open Top Chambers' with trees growing in them, in order to study how the expected climate change affects the forest. Extra CO_2 is pumped into four of these mini-greenhouses; the other four form the control group.

The newly started study is far from theoretical because the large-scale deforestation is already leading to climate change in the Amazon region. Brazilian researchers from INPA and the agricultural institute Embrapa have noticed that the dry season is getting longer and drier, the rainy season a bit wetter, and that the amount of heavy rainfall is increasing. These changes are reducing the rainforest's resilience. The Amazon needs an average of 100 millimetres of rainfall per month, says the INPA researcher Bruce Nelson. In extremely dry years such as 2015, when El Niño reared its head, a lot of trees died and the forest could catch fire more easily.

PALM OIL PRODUCTION

But agriculture, one of the causes of deforestation, is affected by climate change too now. I noticed this when I visited the research institute Embrapa in Belém, at the mouth of the Amazon. Here, forest has already given way to grassland for livestock and plantations for oil palm and timber production. Researcher Alessandro Araujo, another WUR research partner, is studying an oil palm plantation of 8000 hectares. He notices that the plantation's oil production has fallen by 20 per cent in recent years, partly due to increasing drought. The palm oil company that Araujo is studying is over 20 years old and cut down rainforest in order to plant the oil palms. But most of the palm oil companies started later and bought up exhausted land from livestock farmers. It was compulsory for them to replant 50 or even 80 per cent of their land with trees. That is why remnants of rainforest and new timber plantations can be seen around Belém. In the old days, oil palm production went hand in hand with deforestation; now it is combined with reforestation with teak and timber.

ROBUST MIXED CULTIVATION

Araujo is also doing research on agroforestry systems. In the village of Tomé-Açu, 20 kilometres south of Belém, he is studying a company that intercrops cocoa palms with pepper, the 'superfruit' açai, or rare tree species. Just as he does on the oil palm plantation, Araujo takes measurements at this company of the CO_2 storage, water use, plant respiration, water consumption and soil quality. His first impression: the agroforestry system is more robust than the monoculture, because it can resist drought better.

This makes intercropping a potential alternative to the dominant slash and burn method of developing the Amazon. While nature conservationists try to stem the human infiltration of the virgin rainforest, other NGOs and companies are working on developing a sustainable forest economy in the Amazon. In Tomé-Açu, for example, I met Debora Castellani of the Brazilian cosmetics firm Natura. The owner of The Body Shop, Natura uses palm oil, cocoa, wood extract and passion fruit in its cosmetics. These ingredients are still sourced from large monocultures in the Amazon, but Natura is now opting for sustainable development and small farmers, says Castellani. The 50 hectares of agroforestry in Tomé-Açu are a start.

BUSINESS MODELS IN THE FOREST

There are other places, too, where organizations are working on projects for combining economic development with nature conservation. The basic principle is that living trees are more lucrative than felled trees, says Virgilio

▶ An Open Top Chamber with which INPA will study how the expected climate change affects the forest. In four of these mini-greenhouses, the trees get extra CO_2; the other four form the control group.

You stop deforestation mainly by helping the local population find business models in the forest, says FAS director Virgillio Viana.

Viana, director of Amazonas Sustainable Foundation (FAS) in Manaus. You don't stop deforestation by policing the forest, says Viana, but by helping the local population find business models in the forest. FAS develops local food supply chains. For example, the NGO invested two million dollars in a supply chain for the pirarucu, one of the main fish species in the Amazon. FAS encourages Indian tribes to start farming the fish in ponds, provides installations for cooling the fish in the villages, and organizes the sale of the fish on a market in Manaus. This way FAS has cut out the middlemen, so that the fish farmers got twice the price for their catch. The organization is working on comparable production chains for nuts and cassava flour from the forest.

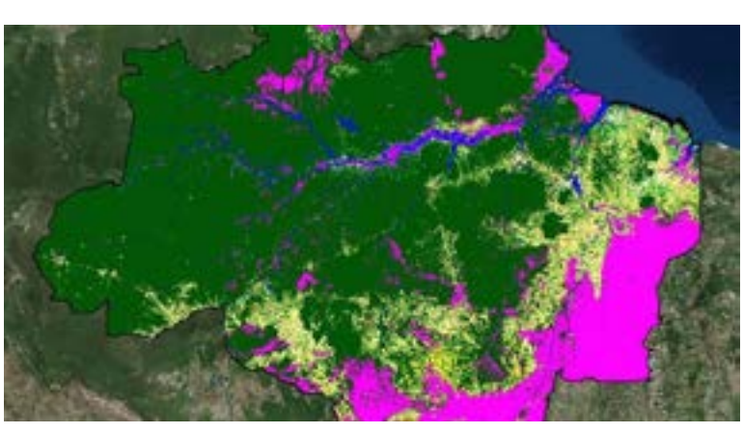
FAS is already reaching 40,000 inhabitants in nearly 600 villages in the Amazon. If you strengthen these local communities, they can make a fist against land grabbing, says Viana, former professor of Forest Management in São Paulo. When he was Secretary of State for the Environment and Sustainable Development 10 years ago, he succeeded in reducing deforestation in the Amazon region by 70 per cent. At FAS, he gets support from companies such as Coca-Cola, Samsung, the oil company Petrobras and the bank Bradesco.

HELPING PAY FOR CONSERVATION

How can we save the Amazon? It's complicated. Banning new settlement of the Amazon, as ecologists would like to do, does not seem feasible. The colonization of the area, with the deforestation and fires that entails, just goes on. Greenpeace's remedy – stop eating soya and oppose free trade – does not affect the colonists and gold-diggers. So what does? Viana has a piece of advice for the EU. He is all for the Mercosur trade agreement, but that agreement should first and foremost regulate the trade in sustainably produced food from the Amazon to Europe. 'Sustainability and the conservation of the Amazon must be reflected in the price of products from the rainforest. Then European consumers can simply help pay for the conservation of the Amazon.' Ⓡ

Amazon research in trouble

Since 2015, the Brazilian government has cut funding for education and research. A federal research fund for ecologists will be reduced this year by 80 per cent, and the number of research grants for MSc and PhD students will be halved. The agricultural institute Embrapa's budget will be cut by 40 per cent.



DEFORESTATION

According to the Wageningen climate researcher Bart Kruijt, 20 per cent of the Amazon region is now deforested. Most of that deforestation takes place on the edge of the Amazon region, in the 'Arc of Deforestation' (the yellow area on the map). That is also where soya cultivation is still increasing, but according to the environmental institute Imazon in Belém, that is not the main cause: by far the most forest is felled for pasture for livestock. The link that organizations such as Greenpeace make with soya cultivation is largely unfounded. Partly thanks to Greenpeace, a moratorium has been declared on soya farming in the Amazon. Another, bigger cause of deforestation is mining, says researcher Lucas Ferrate. People speculate that there are minerals and gold in the ground in nature reserves, and that attracts gold-diggers and land grabbers.