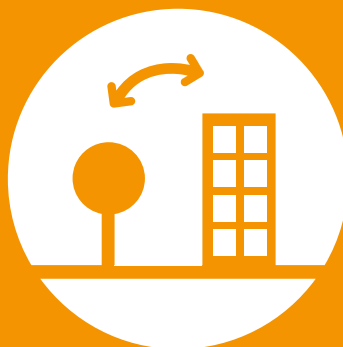




# 2018 GLOBAL OBSERVATORY ON NON-STATE CLIMATE ACTION



LULUCF

BOOK 1 Sector based  
action



**SECTOR-BASED ACTION /LULUCF IS A THEMATIC EXTRACT FROM THE OBSERVATORY  
OF GLOBAL NON-STATE ACTION ANNUAL REPORT 2018  
OF THE GLOBAL OBSERVATORY OF NON-STATE CLIMATE ACTION**

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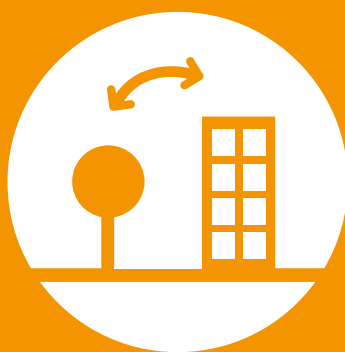
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# LAND USE, LAND-USE CHANGE AND FORESTRY (LULUCF)

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# LULUCF emissions and the disappearance of the forests: A situation as dramatic as ever

In its overall assessment of greenhouse gas emissions (GHG), the IPCC estimates in its 5th report that the land use and land-use change and forestry sector (LULUCF) is an important sector, responsible for 20 to 25% of global greenhouse gas emissions. Soil contains between 1500 and 2400 gigatonnes of CO<sub>2</sub>, about two to three times the amount of carbon in the atmosphere. The balance between release and storage of carbon in soil is crucial to maintain the climate balance, and the different scenarios envisaging carbon neutrality by the middle of the 21st century all rely on the capacity of forests, grasslands and wetlands to store a portion of the CO<sub>2</sub> emitted. Maintaining forests is also a challenge in terms of biodiversity, rain regulation and local communities.

«There is no need to cut down forests to produce more food» is the message hammered out by FAO in its 2016 report entitled «Forests and agriculture: challenges and opportunities for land use». According to the FAO, deforestation in the tropics and subtropics is mainly due to large-scale commercial agriculture (40%) followed by local subsistence agriculture (33%), infrastructure (10%), urban expansion (10%) and mining (10%), «with, however, significant regional variations».

Head Editor • *The Climate Chance Observatory team*

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## 1 • THE LULUCF SECTOR: EVER-DIFFICULT ESTIMATIONS



More complex to calculate than the CO<sub>2</sub> emissions linked to fossil fuel combustion, their aggregations are highly uncertain as underlined for example by the Global Carbon Project in its “Global Carbon Budget” and which propose two figures separating LULUCF from the rest of the other sources of emissions. This margin of error can reach 30%, as shown by the Carbon Budget Global Carbon Project chart, which estimates 2016 land use emissions at 4.6GtCO<sub>2</sub>eq (see Figure 1).

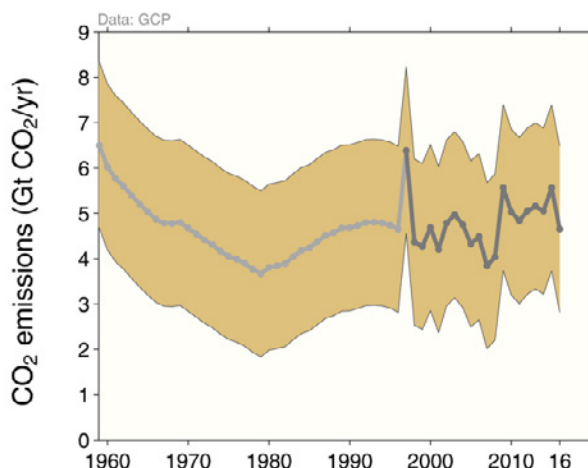


FIGURE 1: ESTIMATES FROM TWO BOOKKEEPING MODELS, USING FIRE-BASED VARIABILITY FROM 1997

Lecture: “Land-use change emissions are highly uncertain. Higher emissions in 2016 are linked to increased fires during dry El Niño conditions in tropical Asia”

Sources: [Houghton and Nassikas 2017](#); [Hansis et al 2015](#); [van der Werf et al. 2017](#);

[Le Quéré et al 2017](#); [Global Carbon Budget 2017](#)

In its annual report on trends for GHG emissions «*Emission Gap Report 2017*», the United Nations Environment Programme (UNEP) highlights the doubts existing on the data provided by the States, quantifying at 3GtCO<sub>2</sub>eq the differences between scientific estimates and the aggregation of the data from the national reports. The

role of soils in emissions offsetting policies of other sectors, with the associated financial flows, also leads States to overestimate their carbon sinks potential, including in Europe. **According to a recent study (Luftalla et al., 2018), the conversion of forests and grasslands to soils rich in organic carbon generates a CO<sub>2</sub> flux from soils to the atmosphere corresponding to 10% of anthropogenic greenhouse gases. The fight against deforestation is therefore one of the major challenges of climate stabilisation.**

Since few countries provide annual figures for their land use-related emissions, and forests are often the main contributors to CO<sub>2</sub> fluxes (CITEPA), we have chosen to focus mainly on trends for forest cover, well documented worldwide. Trends for other categories of land use, such as the disappearance of grasslands and wetlands, the growth of artificial areas or cultivated land, would however require a dedicated analysis of their respective factors.

The causes of deforestation are particularly diverse and heterogeneous depending on the country and the continent: from urban sprawl to the development of intensive agriculture, from the firewood needs of the local populations to drilling for oil, or again from cutting down trees for precious woods to mining activity. In the particularly significant losses recorded in 2016, up 51% compared to 2015, forest fires also played a significant role: Brazil lost 3.7 million hectares, more than triple that in 2015. Portugal lost 4% of its forest area, and in Canada, the high-profile Fort Murray fire resulted in the loss of 600,000 hectares (Global Forest Watch estimates). Given such diversity of causes, we have chosen to scan the situation by continent, without seeking to be exhaustive, but by going over some major facts of recent years. This panoramic sweep, hardly optimistic in view of the figures, will cross-reference different tools used for the maintenance of forests, certifications, compensation mechanisms and so on, in a field where debates between players on the impact of these mechanisms are sharp.

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### **United Nations strategic plan for forests**

The seriousness of the situation, with an estimated loss of 13 million hectares of forest per year (UN figure), has led the United Nations to adopt a strategic plan for forests. This Strategic Plan was adopted by the Economic and Social Council (ECOSOC) on 20 January 2017 on the recommendation of the United Nations Forum on Forests, before being approved by the General Assembly on 27 April. It is based on six objectives and 26 targets, which are, as recalled by the President of the General Assembly Mr Peter Thomson, directly related to those of the 2030 Agenda for Sustainable Development.

The objectives are to end the reduction of forest cover by sustainable forest management; to enhance the economic, social and ecological benefits derived from forests; to significantly increase the surface area of protected forests and sustainably managed forests; to mobilise substantially larger financial resources; to promote governance frameworks for sustainable forest management; and to strengthen cooperation, coordination, coherence and synergies as far as the questions of forests are concerned.

Source: Economic and Social Council (ECOSOC)

TEXT BOX 1

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## **2 • THE RESUMPTION OF TROPICAL DEFORESTATION**

After a lull in the early 2010s, deforestation accelerated again in 2017, the second most devastating year in contemporary history after 2016. According to the report published by the Institute of Hydrology, Meteorology and Environmental Studies of Colombia (IDEAM), Brazil, the Democratic Republic of Congo, Indonesia, Madagascar, and Malaysia have suffered the biggest losses in 2017.

• **BRAZIL: SEE-SAW DEFORESTATION** • Brazil lost more than 6000km<sup>2</sup> of forest cover in 2017, albeit a bit less than in previous months (7989km<sup>2</sup> between August 2015 and July 2016), but much more than the encouraging results of previous years (the Brazilian Ministry for the Environment). According to the estimate of the National Institute for Space Research (INPE), deforestation had reached its lowest level in 2012, with 4571km<sup>2</sup> of forest cut down, compared with the peak of 27,700km<sup>2</sup> in 2004. This deceleration in one year was however welcomed by President Michel Temer, in power since 2016, who was pleased that the deforestation curve had reversed after three years of increases. The intervention of the Brazilian President was also an attempt to respond to the threat from the Norwegian government – the main contributor – to halve its contribution to the fund for the preservation of the Amazon rainforest in 2017, compared to the \$100 million paid in 2016.

The causes of this deforestation are known: keeping livestock and agriculture, and notably soybean exports. The port of Lorient, in France, also received the biggest cargo of soya in its history on 25 September 2018: 63,000 tonnes of soybeans from Brazil and Argentina were landed in one go by the Chloé freighter flying the flag of the Marshall Islands. This unloading aroused the anger of anti-GMO activists who demonstrated on the site, denouncing the transgenic and glyphosate resistant soya destined as Breton pig feed, and making reference to the wish of the region of Brittany – the owners of the port – which has still not been acted on, who in 2004 had passed a motion on the limitation of imports of GMO products.

## Low carbon agriculture in Brazil?

Faced with criticism over its climate policies and the increase in its greenhouse gas emissions due to its agricultural sector, the Brazilian government, in partnership with the Brazilian Agricultural Research Institute (Embrapa), is highlighting its strategy for «Low Carbon Agriculture» (the ABC Plan). It is a Crop-Livestock-Forest Integration (ILPF) technique that alternates cattle breeding during the dry season with growing legumes in the summer on a plot where eucalyptus trees can also be planted. which generate income from felling, enrich the land, capture emissions of gases emitted by cattle and give them shady areas... The organic matter of the cattle allows them to nourish the soil and the nutrients to be retained in the earth. Developed in 2005 by Embrapa in the Centre-West region, this technique has already been applied on 11.5 million hectares in about ten years. The goal? By developing this technique on 55,000 hectares by 2030, the aim is to reduce greenhouse gas emissions by almost 300 million tonnes of CO<sub>2</sub> equivalent, or almost 13% of Brazil's total emissions in 2016. But no authority has been in control of the effectiveness of the implementation so far, and of the €5.3 billion unlocked, only €3.6 billion were used...

Source: La Croix, 11 February 2017

### TEXT BOX 2

#### • OTHER AMAZON BASIN COUNTRIES •

In this report we publish a study on Peru, a country strongly committed to the facilitation of the climate convention, but struggling to curb deforestation on its territory, despite commitments made at COP21. It is not the only one causing anxiety. In Colombia, deforestation doubled in just one year in the Amazon part, reaching 2200km<sup>2</sup> in 2017 i.e. the surface area of Luxembourg (Source: IDEAM, 2018).

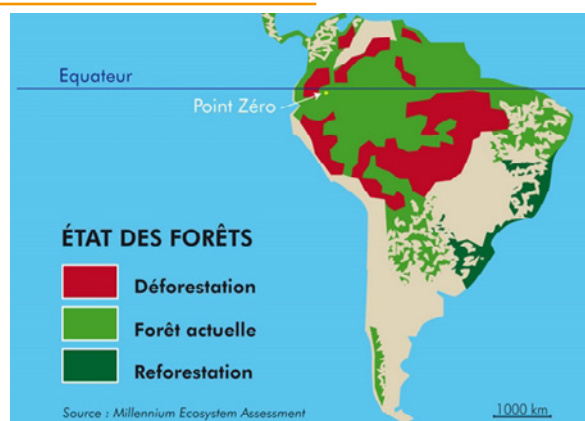


FIGURE 2. STATE OF LATIN AMERICAN FORESTS IN 2012

(Source: Millennium Ecosystem Assessment)

## Colombia's supreme court rules in favour of an NGO on behalf of its international commitments

In January 2018, 25 children and young people prosecuted the Colombian State, accompanied in their initiative by the NGO Dejusticia, which styles itself as an «investigation-action» centre. The group demanded that the government guarantee their fundamental rights to life and the environment, and respect their constitutional rights. The Colombian Supreme Court has ruled in favour of the young plaintiffs. On 5 April 2018, it recognised the Colombian Amazon as a «subject of law». The government was served an order to prepare an action plan to preserve the forest in four months. Among the failings of the Colombian State identified by the Supreme Court, the fact that the severity of deforestation has not been measured to its true extent, «despite the many international commitments» of Colombia, emphasises the issue of greenhouse gas emissions.

Source: Dejusticia Centre for Legal and Social Studies

### TEXT BOX 3

The reasons for this deforestation repeat themselves from one country to the next: logging and agriculture, mining activities and the depletion of land that leads farmers to clear new ones. Oil drilling is another important factor of deforestation, including the creation of roads and infrastructures leading to sites for the exploitation of deposits, which open the way to other exploitations (wood, gold panning, etc.). Symbolising this race for oil and currency, in August 2013, the Ecuadorian President Rafael Correa authorised the exploitation of hydrocarbons in the Yasuni Natural Park. This exceptional reserve, created in 1979, was classified as a World Biosphere Reserve by UNESCO in 1989. It covers 982,000 hectares in the Aalto Napo basin and is home to two indigenous groups living in voluntary isolation: the Tagaeri and Taromenane. Rafael Correa attempted to bury the Yasuni ITT project launched in 2007, which proposed to abandon drilling for 900 million barrels of oil on condition of an international contribution of \$3.6 billion, half of the shortfall for the country. The fundraising, managed by the UN, has raised only \$13 million, and \$116 million in borrowers' notes (Lavaud JP, Mediapart 2016). On 7 September 2016, the Ecuadorian government launched drilling for the deposit despite the mobilisations of environmental defenders and associations for the defence of indigenous peoples from this region. In Venezuela, and especially in Bolivia, where President Morales has also authorised oil exploration in several major reserves, the situation is being repeated with the mobilisations of indigenous communities failing to block projects.

• **ACCELERATING DEFORESTATION IN AFRICA** • According to the FAO, deforestation on the African continent is the fastest growing in the world, faster than in the Amazon rainforest. It estimates that this loss of forest area is of the order of 3.1 million hectares per year, in the last five years. In its 2016 report «*State of the World's Forests 2016*», it underscores the particularity of the African continent, where many poor households are adopting «low-risk, low-yield» farming and income-generation strategies, and where subsistence farming remains the main driver of deforestation. Large-scale commercial agriculture accounts for one-third of Africa's deforestation, compared to an average of 40% in all tropical and subtropical countries.

The situation remains very different between the countries of the Congo Basin, with a profile known as «high forest canopy, low deforestation» (CEFD) where deforestation is still localised, but where the main threats are now concentrated, and the catastrophic situation in West Africa, where it exceeds 2% per year with the forest having lost about 85% of its original area.

A country, such as the Ivory Coast, which has a special feature in this report, has lost almost all of its primary forest and its remaining classified forests continue to be invaded by illegal plantations, principally cacao. The Ivory Coast now has the highest rate of deforestation on the continent according to the REDD+ Ivory Coast report, 2017. Between development issues with the possibility of resources linked to export crops for poor people, and weak States, the situations remain very difficult to control; even if governments multiply statements about their desire to preserve or restore their forest cover, while looking towards climate finance, in particular linked to the REDD+ mechanism.





## Emissions trading systems: Prospects for the forestry sector?

In 2015, forest carbon projects accounted for 29% of the volumes traded, and ranked second, just behind renewable energy development projects. Taking into account the credits exchanged on both the voluntary and compliance markets, the main projects are the REDD+ projects, followed by improved forest management projects. While REDD+ projects largely dominate the international voluntary

market, the improved forest management projects are mainly present in the compliance markets, principally in California and Australia. Despite a significant and continuous decline since 2011, the prices achieved by forestry projects remain higher than the average observed for the entire voluntary market (\$5.7/tCO<sub>2</sub>eq for forestry projects compared to an average of \$2.8/tCO<sub>2</sub>eq for 2015, a historic minimum).

Source: [French Agriculture Academy \(AAF\)](#)

TEXT BOX 4

As part of the Central African Forest Initiative (CAFI), two conventions have been signed; one with the Democratic Republic of Congo, the other with Gabon for \$18 million to protect the country's forests and accelerate the fight against climate change. «*This agreement is a big step forward. Gabon commits to measures that, once implemented, will preserve 98% of its forests*», said Vidar Helgesen, Norwegian Minister of Climate and Environment and President of CAFI. «CAFI is proud to support this ambitious but pragmatic plan, which aims to ensure that the economy of a middle-income country grows while preserving its invaluable natural capital, for the Gabonese and for the whole world.» (Source: UNDP)

In the Democratic Republic of Congo (DRC), alerted by NGOs including Greenpeace, on 6 March 2018, CAFI publicly announced that it will suspend funding to the government until illegally re-allocated timber licences are revoked. The DRC Ministry for the Environment had reinstated three timber licences owned by Chinese companies, SOMIFOR and FODECO, for a total of 6500km<sup>2</sup> (an area equivalent to that of the French department of Drôme). Two of these concessions encroach on 145,000km<sup>2</sup> of recently discovered peatlands containing some 30 billion tonnes of carbon, with a significant risk of methane emissions associated with the opening of this massif to logging (Greenpeace, 2018).

## The Central African Forest Initiative (CAFI) for Sustainable Forests in Africa

CAFI is a collaborative partnership that brings together the Central African countries: Cameroon, Gabon, Equatorial Guinea, Central African Republic, Republic of Congo, Democratic Republic of Congo, and a coalition of donors: Germany, South Korea, France, Norway, the Netherlands, the United Kingdom and the European Union, and finally Brazil as South-South partner. Partners' commitments are formalised through the CAFI Declaration. CAFI is a unique initiative that supports national strategic and holistic domestic investments in REDD+ and low-emissions development, while focusing on Central African countries with high forest cover. Its purpose is to recognise and preserve the value of forests in the region so as to mitigate climate change, reduce poverty and contribute to sustainable



FIGURE 3 THE CENTRAL AFRICAN FOREST IN FIGURES

Source: CAFI infographic

development.

CAFI's support is focused on:

- The development and implementation of **National Investment Frameworks (NIF)** validated at the highest level by national institutions whose mandate is cross-sectoral;
- Funding based on the achievement of programmatic and political milestones as set out in letters of intent;
- Donor coordination and alignment of assistance with the NIFs of partner countries;
- Inclusive participation of all stakeholders
- CAFI support goes through the CAFI Fund, a trust fund managed by the UN Multi-Partner Trust Fund Office.

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TEXT BOX 5

• **TRENDS FOR THE TIMBER INDUSTRY IN AFRICA** • The trend for logging in Africa is also an important piece of information. At the start of 2018, the Africa branch of the Rougier Group filed for bankruptcy. A listed family company, Rougier is one of the oldest and biggest timber companies in Africa. Its first okoumé tree operations started in the 1950s in Gabon; it is also present in Cameroon, Congo and, since 2015, in the Central African Republic (CAR). The total area owned by the Rougier Group is over 2.3 million hectares and it employs 3000 people, mainly in Africa. It should totally or partially divest itself of its operational activities on the continent, except in Gabon. Other forestry companies, most of them European, have had to sell some of their assets in recent months. The Wijma Cameroon Group, with Dutch capital, had to sell four of its five timber licences in Cameroon in 2017 to a competing company (Vicwood SA, with headquarters in Hong Kong). The Italian company Cora Wood SA, a well-known plywood manufacturer established in Gabon, had to sell one of its concessions to a Chinese company.

This mutation is a concern. It would mean for Alain Karsenty, researcher at CIRAD, and who has published a long article on the subject: *«the end of a cycle opened by the first forest management plans in the 1990s, and which continued with the revival of the “good forest management” certification» (the Forest Stewardship Council label, FSC) some 15 years later. It was then thought that sustainable forest exploitation of the natural forest – reconciling economic profitability, ecological dimension and social progress – had demonstrated its feasibility in Central Africa, despite the well-known governance problems in this region (...). However, the profitability of exploiting natural forests has relied, until now, on the collection of a handful of species well known to timber consumers (...). The advantage of this extremely selective exploitation is that the forest is scarcely damaged by taking rarely more than, on average, one or two trees per hectare, i.e. 10 to 12m<sup>3</sup> (...). European dealers, formerly essential in African timber operations and industry, are gradually yielding their assets to Asian investors. While Malaysian operators have been present in Central Africa since the mid-1990s, Chinese companies have entered the industry properly since the 2000s, and more recently Indian investors, including the multinational Olam, have made their presence known in Gabon and Congo. These operators have significant capital and the markets in which they operate accept qualities sometimes lower than those demanded by European buyers (...). European operators are wondering if they are on a level playing field with some of their Asian competitors. Large European companies have gradually complied with legal standards by preparing forest management plans, made compulsory by the new generations of forestry laws that appeared in the years 1990-2000. Some of them went further, adopting a rigorous logging certification, the FSC. This label is important to gain or maintain market share in certain Western markets sensitive to environmental issues (in Northern Europe, in particular) and hope for a higher purchase price for the timber thus labelled. Certification is therefore an investment that drives companies to self-regulate in order not to lose*



the label whose implementation in the field is regularly checked by independent auditors. However, apart from Olam, which bought a large concession already certified in north Congo from a Danish company in 2011, no Asian-owned operator has seriously sought, at least until now, to obtain the FSC label for its permits."

Source: <http://www.willagri.co.m/2018/06/28/la-crise-de-la-filiere-europeenne-du-bois-tropical-en-afrique-centrale/>

In this situation, which sees the threat of progression from exploitation of a specific species to a more complete deforestation, the decision of Gabon against the trend of the sector cannot go unnoticed. Gabonese President Ali Bongo Ondimba has announced that Gabon will withdraw logging permits from any operator that is not engaged, between now and 2021, in a process of certification of the Forest Stewardship Council (FSC), with 2022 as the cut-off year. Gabon, which has not exported logs since 2009, but already provides some of the processing in its territory, is principally targeting markets in Northern Europe, where certification is necessary.

Other threats weigh on African forests without us being able to detail them all here. Illegal deforestation to provide softwood for Africans (timber exploited by large international companies being too expensive for local populations and reserved for export) is a developing phenomenon, leading to specific programmes financed, for example, in the framework of REDD+ in the Ivory Coast. Deforestation related to firewood is well known, and initiatives to control it are numerous without so far demonstrating any significant impact. As for many African cities in development, the search for firewood today requires traveling great distances, which also causes an increase in its price. Finally, the risk of land grabbing is real, as shown by the arrival of the Korean company Daewoo Logistic in Madagascar, where it took out a 99-year lease on 1.3 million hectares, creating a major political crisis.

• **MALAYSIA AND INDONESIA** • Malaysia, which derives 11% of its GDP from the exploitation of palm oil, has not reduced its rate of deforestation in 2017 according to [the estimates of the NGO Global Forest Watch](#).

In **Malaisie** from **2001** to **2015**, **91%** of tree cover loss occurred in areas where the dominant drivers of loss resulted in **permanent deforestation**.

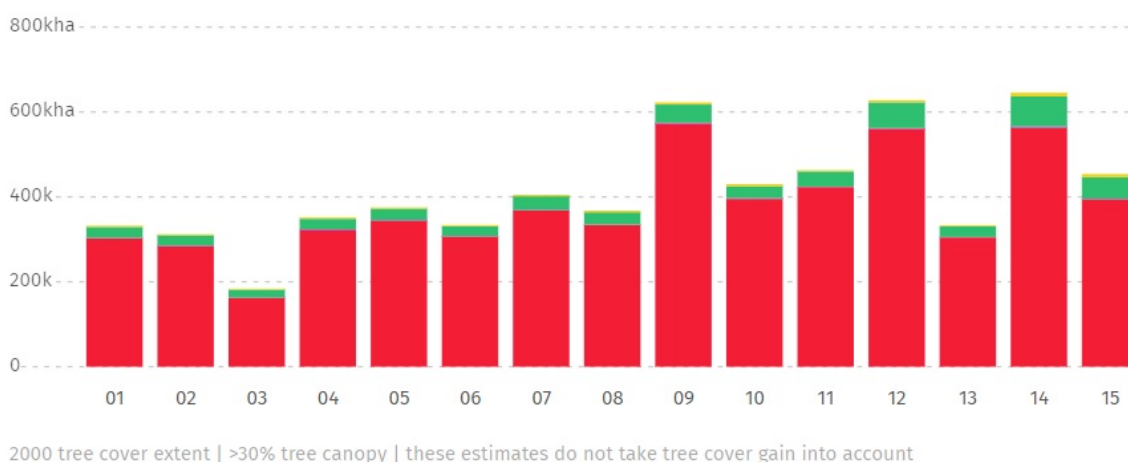


FIGURE 4. LOSS OF THE FOREST CANOPY IN MALAYSIA BETWEEN 2001 AND 2015 SOURCE: GLOBAL FOREST WATCH, 2018.

Source: Global Forest Watch, 2018

On the other hand, Indonesia has decided to significantly reduce its deforestation, with a moratorium on forests introduced by the Indonesian government in 2016. This has enabled the reduction of deforestation by 88% in the primary forest areas of protected peatlands. This political will has also resulted in the application of stricter laws and media coverage of the arrest of logging company managers. Finally, weather conditions, notably wet weather, have also played a role in reducing forest fires on the archipelago (Source: Global Forest Watch). The many toxic fires and clouds, with strong consequences for human health, were also driving forces in the Indonesian government's decision.

Indonesia Primary Forest Loss

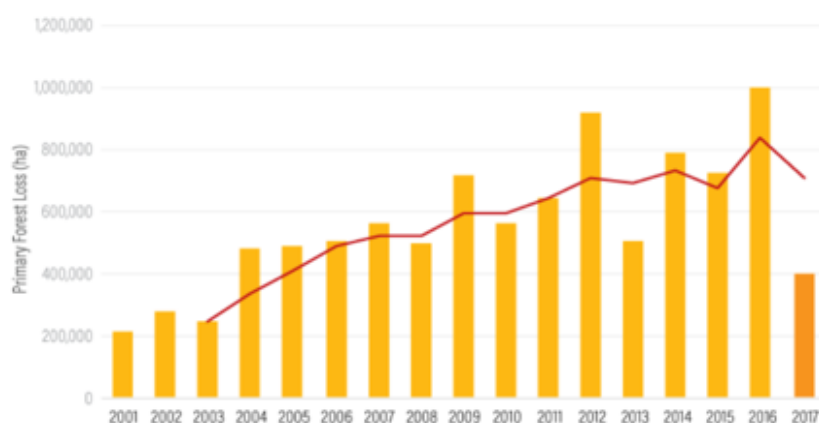


FIGURE 5. LOSS OF PRIMARY FORESTS IN INDONESIA (IN HECTARES).

Sources: World Resources Institute / Global Forest Watch

### Indonesia comes to the aid of its peatlands

A team of European and Indonesian scientists, offering satellite imagery and an aerial mapping system to prevent peatland fires ravaging forests in Indonesia, won a \$1 million (€900,000) prize in 2017 awarded by the Indonesian government. These organic-rich wetlands contribute annually to forest fires in the South-East Asian archipelago. To fight against this scourge, the government launched this competition, to which more than 40 teams of scientists applied, with participation from experts in remote sensing from all over the world, according to the organisers.

The winners, the international peatland mapping team with scientists from Indonesia, Germany and the Netherlands, have developed a method combining an airborne laser mapping

system and ground measurements to determine the depth and the extent of the wetlands and peatlands. This technology should enable increasing the measures taken to protect the peat – a particular and fragile ecosystem – and prevent forest fires. The Indonesian authorities have already tightened peatland protection legislation to prevent the conversion of carbon-rich soils into plantations, particularly for palm oil, which fuels the devastating annual forest fires during the dry season.

Drainage of these waterlogged lands to extend oil palm plantations increases the risk of peat fires that are very difficult to control, and the Indonesian government has also tightened water management legislation to avoid their drying out.

Source: Le Figaro with the AFP

TEXT BOX 6

The destruction of primary forests, particularly on the island of Borneo, threatening orangutans, has become one of the great symbols of harm to the environment in the world, generating questions about consumption patterns via the question of palm oil.

In June 2018, the European Parliament voted in favour of banning palm oil for agro-fuels as early as 2021 – a deadline postponed until 2030 after a difficult negotiation with the European



Commission – but their consumption should have begun to decrease in 2023. In France, the authorisation of the oil company Total to use 300,000 tonnes of palm oil for its La Mède refinery also provoked huge controversy, highlighting public awareness of this issue.

Malaysian and Indonesian producers, who account for 85% of the world's production, are paying close attention to European debates, using the weapon of commerce to threaten European countries, primarily France, with retaliation that would limit access to palm oil in their market.

### 3 • REFORESTATION

On a global scale, the balance is still very clearly negative, but reforestation is nevertheless an important element of the global forest canopy action, even if these replantings rarely equal the rich biodiversity of the deforested territories.

The figure above shows a net loss of forest area in tropical zones in each of the three five-year periods between 2000 and 2015. By contrast, temperate zones recorded a net increase in forest area during each of these periods. Finally, only relatively minor changes were observed in boreal and subtropical forest zones.

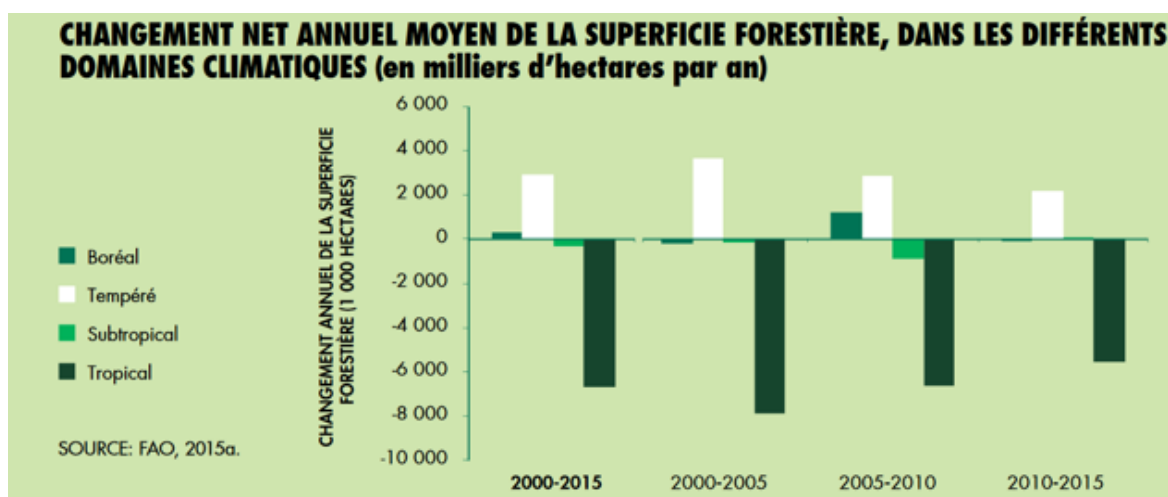


FIGURE 6. AVERAGE ANNUAL CHANGES IN FOREST AREAS BY GLOBAL REGIONS BETWEEN 2000 AND 2015

Source: FAO, 2016

• **THE COMPLEXITY OF EUROPEAN ACCOUNTS IN THE LULUCF SECTOR** • The European Commission's report to the European Parliament and the Council of 7 November 2017 provides a relatively positive overview of the LULUCF sector in Europe, with a view to achieving the European Union 2020 climate objectives: «In 2015, according to the information provided, the LULUCF sector of the Union has, through its carbon sink function, absorbed 305Mt of CO<sub>2</sub> equivalent (cropland and pasture included). The credit recorded, which represents the difference between the reported value and a baseline scenario, increased from 115 to 122Mt of CO<sub>2</sub> equivalent between 2013 and 2015. This credit is largely due to forest management (see Figure 4). The Union therefore remains on track to ensure that its LULUCF sector is not in debit and is likely to meet the commitment under the Kyoto Protocol.»

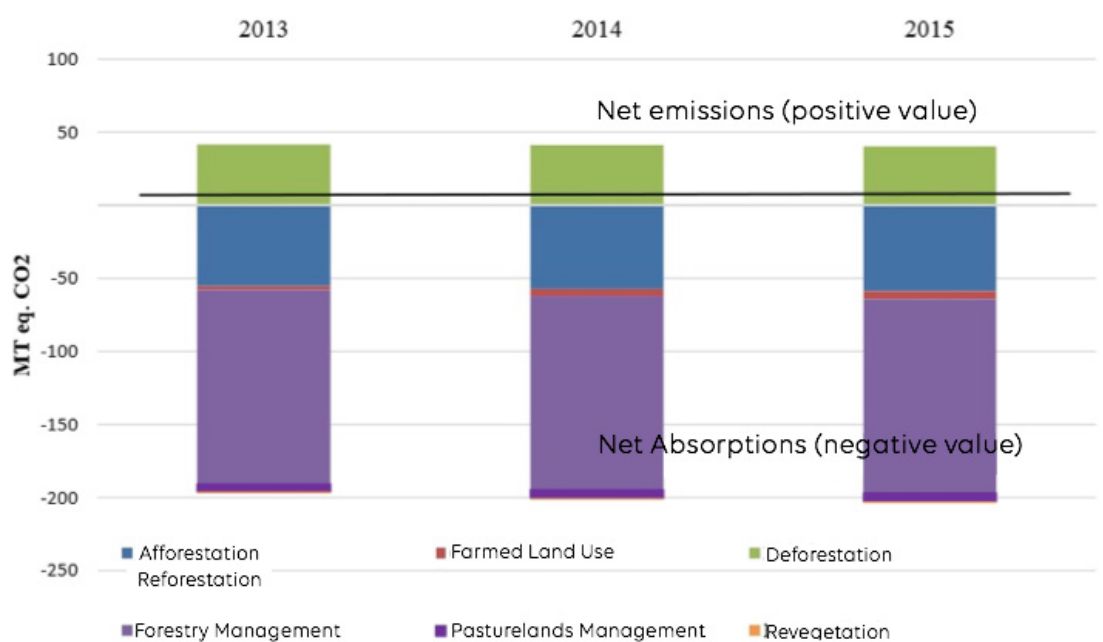


FIGURE 7: EMISSIONS AND REMOVALS RECORDED FOR LULUCF BY ACTIVITY FROM 2013 TO 2015

«It should be noted that LULUCF accounting will be cumulative for the period 2013-2020; therefore, the full accounting results cannot yet be calculated and are thus provisional. However, as mentioned above, there is currently no significant risk of non-compliance at Union level.» concludes this communication from the European Commission.

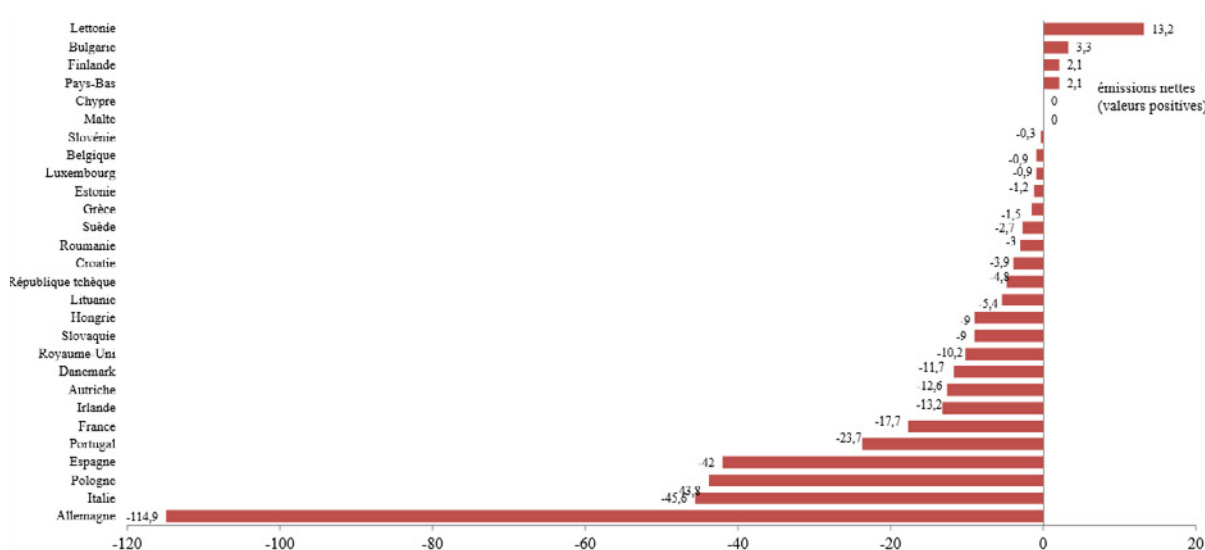


FIGURE 8: PROVISIONAL ACCOUNTING OF LULUCF CUMULATIVE NET EMISSIONS AND REMOVALS BY EU MEMBER STATES BETWEEN 2013 AND 2015

Source: European Commission, 2017

This Commission communication is nonetheless tempered by another internal note, which shows how governments have recovered carbon credits by exaggerating the logging targets of their forests and thus posting a positive but «fictitious» rate of preservation (it is considered that preservation efforts qualify for credits). But these fictitious credits are not trivial: they were then used to offset the emissions of polluting sectors, under the Kyoto Protocol. «This scam has gone on for too long. Member States must be serious about their forests and correctly calculate the impact of their management practices on the climate» declared the NGO [FERN](#), specialising in these forest issues. It considers that this laissez-faire approach could reduce the European emission reduction





result by 3 to 7 points compared to the 40% reduction target by 2030 (Euractiv 2018). The European Union has issued a new regulation in 2018, which should reduce this risk.

### **The new European regulation**

On 30 May 2018, the European Union published a new regulation (2018/841) on taking into consideration greenhouse gas emissions and removals resulting from land use. The preamble to this regulation emphasises that Member States must ensure the conservation and enhancement of the forest sinks and reservoirs needed to meet the European Union's commitments to the Paris Agreement.

To maintain the carbon stocks of forests and other natural areas, the regulation stipulates that Member States should make sure that the LULUCF sector does not produce net emissions and strengthens long-term sinks. Member States will provide two forest plans at the end of 2018 for the 2021-2025 period and in 2023 for the 2026-2030 period, which will be aggregated at the European level. Member States are allowed to use part of the forest credits created by improving storage to offset their domestic emissions, but with a European ceiling corresponding to 10% of the sink. Today, the annual European «net» sink is estimated at around 30MtCO<sub>2</sub>.

TEXT BOX 7

• **THE RACE FOR TREES IN INDIA AND CHINA** • In 2009, China announced its intention to build «The Great Green Wall of China», the largest ecological project in the world, to extend over 4480km and designed to curb the progression of the Gobi Desert, to combat global warming and restore deforested land. According to the observatory Global Forest Watch, 8 million hectares of forest were lost between 2001 and 2016 in China. Only 6% of the country's forests are primary, 57% are of natural origin and 37% are planted, estimates the observatory.

The Chinese authorities have planned, for 2018, reforestation of about 84,000km<sup>2</sup>, and the newspapers of the whole world echoed the mobilisation of the People's Liberation Army. According to China Daily, **60,000 soldiers were moved from the northern borders of the country to the central part of China, reassigned to planting trees. Zhang Jianlong, Chairman of the Public Forestry Administration was able to point out that, between 2012 and 2017, the equivalent of €68.3 billion were spent to replant trees in the country, bringing the total area of forests in China to 208 million hectares.** Voices have been raised in the past to emphasise that this effort has not always been done by integrating biodiversity issues, and that few species have been used, with significant losses on the plantations.

India is not to be outdone by its neighbour, and is committed to increasing its forest area by 95 million hectares by 2030, a project put forward in the [Paris Climate Agreement](#) and is estimated to cost about \$6.2 billion. But in this race for the record, India has managed the feat of planting 66 million trees, of 20 different species, in 12 hours. As in China, communication was assured and Shrivraj Singh Chouhan – Chief Minister of the State of Madhya Pradesh, where these plantations were carried out – was able to declare: *«the world is talking about global warming and climate change, but Madhya Pradesh has taken a concrete step to deal with it»*.

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### ***Pakistan has succeeded in planting no less than a billion trees***

This project, dubbed «The Billion Tree Tsunami», was launched in 2015 in Khyber Pakhtunkhwa Province in North-Western Pakistan, located between Afghanistan, Iran and India. Between 2000 and 2010, Pakistan lost 430,000 hectares of forest. Today, Pakistan has a forest cover of between 2 and 5% of its area. This is the lowest rate on the Asian continent. This project, started in 2015, aims to restore 350,000 hectares of old forests. Indeed, for several decades this region has suffered significant deforestation related to human activities that has exacerbated the consequences of natural disasters. In 2016, sudden floods hit the province, killing dozens

of people. For three years, more than 16,000 workers worked tirelessly to plant trees of 42 different species and promote the natural regeneration of the forest. As a result, by August 2017, several months ahead of schedule, 1 billion trees had been planted, half of them by the general public, covering the hills of Khyber Pakhtunkhwa province.

Pakistan's Prime Minister Imran Khan has announced that 100 million trees will be planted by 2023, when his term ends. From August 2019, the «Rung Do Pakistan» campaign is already planning to plant 1.4 million trees on 1400 hectares.

Source: WWF Pakistan

TEXT BOX 8

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Thus, Asia appears today as one of the regions of the world intervening most in the reforestation of the planet.

• **REFORESTATION IN AFRICA** • While increased deforestation is occurring throughout the African continent, a number of countries are also symbols for the reclamation of soil quality, with the support of the United Nations Convention on Desertification, whose role is often unknown (this is the third convention planned by the Rio Earth Summit in 1992, with the framework agreements on climate and biodiversity).

Often cited as an example, Rwanda is halfway to reaching its goal of 30% reforestation in 2020, or 2 million hectares of degraded land to restore. In this country characterised by its high population density, the highest in Africa, overexploitation of the land resulted in the loss of a significant part of the forest canopy in the 1990s. Since the commitment was made in 2011, all regions have been involved, and planting days have been set up to mobilise the population. "Rwanda's National Forest Planting Day and Season" is a programme supported by IUCN, a Belgian technical cooperation and a joint Rwanda/Netherlands platform on the management of water resources (Fonerwa, 2018).

Reforestation actions are also being undertaken in many other African countries, such as Ethiopia, Togo, and Senegal with the great green wall project supported by the African Union...

An important initiative was launched at COP 21 to reclaim, by 2030, the equivalent of 100 million hectares of forests and agricultural land that has become unproductive in Africa. Supported by the African Union, the German Ministry of Cooperation and the World Resources Institute and named AFR100 for «African Forest Landscape Restoration Initiative», this initiative, originally brought by Ethiopia, Democratic Republic of Congo, Kenya, Niger, Uganda, Burundi, Rwanda, Liberia, Madagascar, Malawi, and Togo, today brings together 26 African countries. At the last meeting of the technical partners, in August 2018, the commitments made by the States amounted to 91.4 million hectares, through specific projects, many of which remain to be financed (€1.3 billion according to CIRAD experts, also a partner of the initiative).





## CONCLUSION

The continuing destruction of tropical forests is one of the most serious environmental threats today, in terms of both climate and biodiversity. While the Indonesian moratorium will have to be carefully monitored elsewhere in the world, the situation remains critical, with increased risks for recent political developments or the strengthening of the role of companies with little regard for certification. If they do not represent all the LULUCF emissions, forests are an essential element of carbon capture; they are essential for the credibility of carbon neutrality scenarios by 2050. Building an international coherence between their preservation, growing demand for biofuels and changing dietary habits remains a challenge that the world still fails to meet.

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# Preserving Peruvian Amazon rainforest : a societal challenge

By hosting COP20 in Lima in 2014, Peru has taken the place of a leader in the fight against climate change in Latin America. While deforestation and forest degradation are the largest source of CO<sub>2</sub> emissions from Peru with 143,000 ha disappearing in 2017 alone out of the 69 million ha in the country, the target of 0% deforestation by 2021 proclaimed by the government appears ambitious. The diversity of economic activities that destroy forests makes these goals difficult to achieve. Both industrial and family plantations of coffee, cocoa and palm oil, gold mining and logging operations each call for different measures. In parallel with the government setting up a legislative framework called the Framework Law on Climate Change of 2018 and the continued zonification of forests, NGOs, researchers, independent press, local authorities and local communities monitor, report and fight deforestation on the ground, often using the UNFCCC REDD+ program.

Main autor • AUDE VALADE • *Marie Skłodowska Curie fellow, CREA*

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  - The role of local authorities
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- .....



## 1 • AMBITIOUS BUT SOMETIMES CONFLICTING NATIONAL OBJECTIVES

• **DEFORESTATION, THE LARGEST SOURCE OF EMISSIONS** • More than 50% of Peru's greenhouse gas emissions are due to the Land use, land-use change, and forestry (LULUCF) sector. Its relative share has decreased in the last decade in response to increasing emissions from other sectors (MINAM, 2016). The major role of the land sector in Peru's greenhouse gas results stems from the fact that 60% of Peruvian territory is covered by rainforest. These 69 Mha, 94% of which are part of the Amazon rainforest, make Peru the 2nd country in the world with the largest area of the Amazonian forest after Brazil (MINAM, 2016). As in Brazil, deforestation and forest degradation are political, economic and social issues that are decisive in reducing national and global emissions. In 2017 alone, the loss of the Peruvian Amazon forest is estimated to be 143 thousand hectares, 13% less than in 2016 but still a worrying figure because nearly 2 Mha of rainforest have disappeared in total between 2001 and 2016 (Finer et al., 2018).

• **AMBITIOUS COMMITMENTS AND REFINING THE LEGISLATIVE FRAMEWORK** • The Peruvian government is a historic signatory of international agreements on environmental issues, for example by ratifying the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 1973, the Convention on Biological Diversity (CBD), United Nations Convention to Combat Desertification (UNCCD) and United Nations Framework Convention on Climate Change (UNFCCC) in 1992 and recently the Paris Agreement on climate change in 2017. The Intended Nationally Determined Contributions (INDCs) submitted by Peru upon ratifying the Paris Agreement do not specify the means of implementing the commitments, but they set quantified targets for reducing emissions by 20% (30% in case of international financing and favourable conditions) compared to a Business as Usual scenario. For the LULUCF sector, these objectives translate into a reduction target of 48 Mt CO<sub>2</sub> eq compared to a Business as Usual scenario which forecasts 159 Mt CO<sub>2</sub> eq in 2030. In addition to its commitment under the Paris Agreement, the government of Peru has a goal of zero deforestation by 2021 – an ambitious goal announced several times by the Environment Minister at international conferences (COP14 in Poznan, COP15 in Copenhagen) and repeated by the President at the 65th United Nations General Assembly (CIFOR).

With these objectives in mind and after adopting the Forest and Wildlife Act and the National Strategy on Climate Change in 2015 and the National Strategy on Forests and Climate Change in 2016, in 2017 and 2018, the Peruvian government continued to strengthen its institutional and legislative arsenal. On 18 April 2018, the president of Peru issued Law No. 30754 (Congreso de la República, 2018) unanimously approved by the congress a month earlier, and made his country the 1st in Latin America to translate its commitments to the Paris Agreement into its legislative corpus. This law sets the main principles and provisions for articulating climate action in the country. Among the priority strategies to limit and adapt to climate change, the LULUCF sector is the main lever with the objectives of increasing carbon sinks, protection, conservation and sustainable management of forests, afforestation and reforestation and controlling land use and change of use. In terms of implementing the measures, the INDC planned in the Paris Agreement is defined as binding, and the Environment Minister is responsible for its follow-up. The Minister is now accountable to the congress through an annual report on climate action. The role of non-state actors is also a central element of the law defining the principle of transversality, according to which the action of the government relies on the involvement of the private sector, civil society and indigenous peoples, and the principles of transparency and accountability of the authorities to citizens whereby the authorities ensure access to public information on climate change for all citizens. As for concrete measures, one of the major advances brought by this new text is the obligation to use climate projections in environmental impact studies, for example for the construction of roads. The next step in the legislative process is the development of regulations that will specify how the law is

to be implemented, which is currently the subject of a participatory process called Dialoguemos (see Text box 1).

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### **Dialoguemos**

To encourage interest in the issue of climate change by all actors in society and ensure that each of their expectations is taken into account, the Ministry of the Environment has set up the Dialoguemos participatory process. The Ministry of the Environment has launched several Dialoguemos processes – on the implementation of the national contributions planned in the Paris Agreement, on the fight against deforestation via a financing agreement between Peru and Norway and via the REDD+ mechanism, on the fight against desertification and on the regulation of the framework law on climate change. For this, after the preparation of a “zero” document by the Ministry,

28 decentralised, multi-actor or multi-thematic workshops were conducted between June and September 2018. With the aim of gathering the contributions of all the actors in society, the workshops were open to all following simple registration, and some were held in five native languages – Quechua, Aymara, Shipibo Conibo, Awajún and Asháninka. For example, among the submitted contributions, a group of indigenous associations (including Aidesep, CNA and Onamiap) is pushing to be able to participate in the commission that will propose actions to combat climate change and for establishing an indigenous climate platform.

TEXT BOX 1

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Despite these efforts, there are many contradictions between commitments and acts at the national level, as with the vote of 15 December 2017 on a law declaring the construction of roads in the Ucayali region a priority of national interest. Notably, this law paves the way for the construction of a 280 km motorway along the Brazilian border which environmental NGOs and associations of indigenous communities have been opposing for several years. According to the MAAP research programme (see “Researchers and NGOs organise real-time monitoring of deforestation”) which draws on the precedent of the Inter-oceanic Highway completed in 2011 connecting Brazil with 3 Peruvian ports and along which the deforestation fronts multiply, this new project would endanger 2750 km<sup>2</sup> of virgin forest a part of which is in protected areas.

## **2 • FROM MULTINATIONALS TO ORGANISED CRIME – DRIVERS OF DEFORESTATION**

• **AGRICULTURAL EXPANSION** • With its many forms – agro-industrial or food, cocoa, coffee, palm oil, papaya, rice or maize, growing or raising – farming is the primary cause of deforestation in Peru. In terms of area, the agricultural expansion of small and medium-sized plots is responsible for most of the deforestation with 73% of deforestation on plots of less than 5 ha and 96% on plots of less than 50 ha in 2016. On the other hand, the sociology of the actors involved is more difficult to determine. The hypothesis of deforestation being caused mainly by small migrant farmers has recently been shown to be obsolete (Ravikumar et al., 2017) due to the diversity of types of small-scale deforestation. Small farmers sometimes use crop cycles on a stable total area with cycles of livestock, crops, fallow and forest. They then deforest secondary forests on fallow areas. Newcomers clear uncultivated areas, which represents deforestation of primary forest. Small farmers can also convert a set of plots that have been previously cultivated using a rotation system with fallow into single plots of intensive monocultures. All these causes are identified as the same type of deforestation, but they result in different carbon emissions and require different political actions to make them into sustainable practices.

The report of the national ombudsman released in 2018 (Defensoría del Pueblo, 2017) focuses on



deforestation caused by agro-industrial exploitation in Peru. This report highlights the failures of the government that led to the deforestation of 30,773 hectares between 2010 and 2014. Most of the time, these are Peruvian or international companies to whom the government allocates farm concessions. They acquire them by taking advantage of loopholes or corruption of regional governments, or local communities sell them to them, sometimes under pressure.

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### **United Cacao**

An example of investor land grabbing is described by sociologist Juan Luis Dammert Bello in his 2017 report (Dammert Bello 2017) that focuses on the company called United Cacao. Led by the American Dennis Melka, the United Cacao company based in the Cayman Islands arrived in Peru in 2012 and acquired several thousand hectares via its subsidiary Cacao del Peru Norte SAC, including the forests of Tamshiyacu in the state of Loreto, in order to found a cocoa plantation. United Cacao's strategy was based on obtaining higher yields than those obtained in West Africa (2.5 versus 0.6 t/ha) and on the forecast of a cocoa shortage compared to demand up to at least 2020. The goal was to become the largest cocoa plantation in Latin America. Neither the environmental formalities required at the national level, such as the soil survey or the environmental impact assessment, nor the official agreement of the regional government were validated before the start of operations. The scandal in the media and the government's legal actions to stop the activities were not enough and the plantation project continued to expand to occupy nearly 3,500 hectares of which 2,400 had been deforested. In May 2016, a dozen NGOs and indigenous communities wrote to the London Stock Exchange and regulatory authorities denouncing the illegality of the activities of United Cacao, which is listed on the market of alternative investments. In January 2017, United Cacao was removed from the London Stock Exchange and in February from the Lima Stock Exchange. Deforestation and planting activities have stopped in this area.

TEXT BOX 2

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• **GOLD MINING** • Depuis le début des années 2000, le prix de l'once d'or a augmenté pour atteindre des niveaux records en 2013 et s'est aujourd'hui stabilisé à un niveau 4,5 fois supérieur à celui de 2000. Au Pérou, qui est le 6<sup>e</sup> producteur mondial d'or, ce cours élevé stimule l'extraction artisanale et souvent illégale dans la forêt amazonienne, dont les couches géologiques sont favorables à la présence du minerai (Asner & Tupayachi 2017, Alvarez Berrios et Aide 2015). Pour extraire l'or des cours d'eau et plaines inondables, les mineurs rasant la forêt, explosent les rives des rivières et creusent avec des bulldozers pour atteindre les dépôts de graviers desquels l'or est extrait en utilisant arsenic, cyanide et mercure qui empoisonnent les cours d'eau.

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### **Expulsion of gold miners in the Tambopata National Reserve**

In the Madre de Dios region bordering Brazil where 50% of GDP is based on gold mining, the completion of the Interoceanic Highway in 2010 has improved access to remote areas. According to the Ministry of the Environment,

approximately 50,000 illegal miners extract 16 to 18 tonnes of gold each year. In 2016, even the Tambopata National Reserve – a protected area of 275,000 ha – was invaded by miners. In 2 years, more than 550 hectares of virgin forest have been deforested along the Malinowski River (Finer, Novoa & Olexy, 2017). However,

the government succeeded in stopping the extraction activity in 95% of the invaded area thanks to the intervention of the navy alongside the rangers (Daley, 2016). Even though this is a victory, it is not the end of the battle yet, as the illegal extraction activities have increased in the buffer zone around the nature reserve (Finer, Novoa, Olexy & Durand, 2017 ). And in 2017, the rate of deforestation in Madre de Dios

reached its highest level in 17 years with the loss of 20,826 hectares of which 1,320 were directly attributable to mining (Sierra Praeli, 2018). In the first half of 2018 alone, 1,725 hectares of forest were razed. Corruption and organised crime associated with illegal gold mining complicate the fight against these practices.

TEXT BOX 3

• **TIMBER LOGGING** • The forestry law that governs timber logging in Peru was revised in 2015, giving birth to SERFOR – the body in charge of the management of the resource of wood – under the supervision of the Ministry of Agriculture. Timber logging is permitted in certain forest categories for which concessions are granted which, depending on the type of forest, are supplemented by land use change or deforestation permits. All logging is subject to an annual operational plan validated by the regional authorities. This plan must accurately describe the inventory of the parcels in question and the trees selected for cutting or, in the opposite case, for protection. From its extraction in the forest to the sawmill, the warehouse or the port, all transported wood is accompanied by a document called a forest transport guide establishing the place of origin of the timber. Timber trade is also supervised at the international level. For example, the US–Peru Free Trade Agreement signed in 2009 includes a specific annex establishing the commitment of both parties to combat illegal logging. According to this annex, the United States may impose product or exporter audits in Peru and seek to verify the compliance of specific shipments with the power to impose sanctions in case of illegally logged timber.

OSINFOR, set up in 2000, is the institutional body responsible for controlling the use of forest resources and compliance with the rules for logging. In 2014, its controls led to the cessation of all activities at nearly 50% of the visited concessions due to serious and proven fraud. In 55% of the inspected concessions, timber was cut outside the concession boundaries, and 69% of the inspected concessions facilitated logging or transport of protected species (Finer, Jenkins, Sky & Pine, 2014). OSINFOR played a key role in the 2015 record capture of the vessel Yacu Kallpa vessel during Operation Amazonas 2015 (see Text box 4). More than 90% of the cargo destined for the Dominican Republic, Mexico and the United States was illegal. In July 2017, a family-run criminal organisation – “the beavers of the central forest” – active in the three regions of Junín, Ucayali and Lima – was dismantled thanks to the help of three employees of SERFOR (Urrunaga, Johnson, & Orbegoza Sánchez, 2018).

Despite the hope generated by these resounding successes, a report published in February 2018 by the British NGO Environmental Investigation Agency highlights the limits of the measures for fighting illegal logging of Peruvian wood (Urrunaga, Johnson & Orbegoza Sánchez, 2018). The authors describe the practices of falsifying certificates of origin, making up every piece of the forest inventories, the approval by local authorities of wrong annual operational plans allowing wood traffickers to export their products especially to China, the Dominican Republic, Mexico and the United States, with the authorities struggling to cope with the pressure from the forest industry. The EIA survey indicates that SERFOR is now publicly opposing the traceability measures and that its inspection reports have changed from 900 in 2015 to 23 in 2016 and 0 in 2017.



## Operation Amazonas: an example of international and interinstitutional collaboration

Operation Amazonas is the product of interinstitutional collaboration between OSINFOR, the specialist in environmental issues FEMA, the Peruvian customs (SUNAT), INTERPOL and the World Customs Organization (WCO) (OSINFOR, 2016). At the heart of the operation, SUNAT systematically monitored all exports from the port of Iquitos via documents indicating the origin of the traded timber, the GTF. From these documents, OSINFOR officers were able to go into the field and verify the accuracy of the statements. FEMA was in charge of ensuring the legality of the inspection operations of SUNAT and OSINFOR. The WCO in direct contact with SUNAT allowed the inspection of the shipment of timber at its destination and INTERPOL sup-

ported the operation by identifying the criminal organisations involved in the trafficking. This unprecedented collaboration has paid off. In 2014, one hundred and forty-four places of logging were visited, of which 94% were found to be in violation, and led to the seizure 15,700 m<sup>3</sup> of wood. In 2015, the controls of Operation Amazonas uncovered 433,000 m<sup>3</sup> of illegally logged timber and exposed the practices of the ship Yacu Kallpa, which regularly traveled to the Dominican Republic, Mexico and the United States. The investigation revealed that among the 5 trips of the ship in 2015, 82% of the 32,000 m<sup>3</sup> transported had an illegal origin. Seventy-one illegal timber containers were seized in Houston by US justice and the ship was detained in Mexico.

TEXT BOX 4

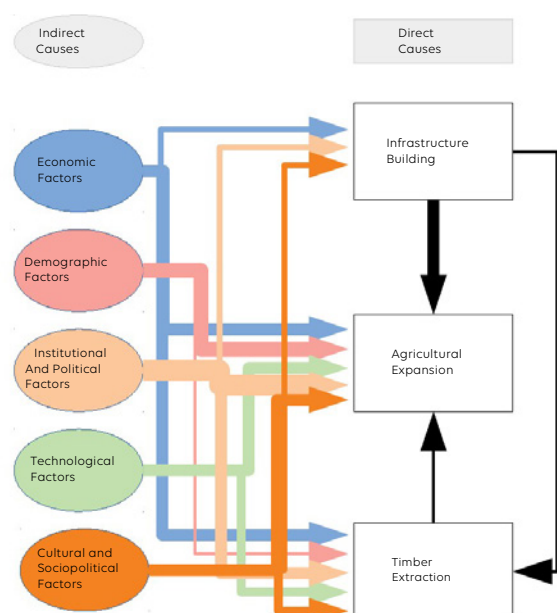


FIGURE 1. REPRODUCED FROM GEIST AND LAMBIN 2002. DIRECT CAUSES OF DEFORESTATION (RECTANGLES) INFLUENCE EACH OTHER (BLACK ARROWS) AND ARE INFLUENCED (COLOURED ARROWS) BY INDIRECT CAUSES (OVALS). THE SIZE OF THE ARROWS INDICATES THE RELATIVE IMPORTANCE OF THE INFLUENCES BASED ON THE STUDY OF THE 152 CASE STUDIES.

### • INDIRECT DRIVERS OF DEFORESTATION •

Direct causes of deforestation (farms, mining, road construction) themselves have indirect drivers that are not always easy to identify, and they highlight the contradictions between environmental and economic objectives. A report from CIFOR (Center for International Forest Research) lists and highlights these complex factors, such as population growth via birth rates and internal migration – sometimes supported by state aid, increased demand for agricultural products and driven by increased purchasing power and international demand (coffee, gold, timber, palm oil and cocaine), national policies to support agricultural expansion and mining companies, or weakness of institutions or the lack of a precise judicial framework on land exploitation (Piu and Menton 2014). Quantifying the importance of each of these mechanisms is difficult, and it is a subject of debates.

In a study of the mechanisms that led to deforestation in 152 case studies, Geist and Lambin (2002) show that tropical forest deforestation can only be attributed to the synergy between direct causes (agricultural expansion, infrastructure development, wood harvesting) and indirect causes (demographic, economic or technological factors or institutional, cultural or socio-political policies) as explained in Figure 1. For example, the case of the extension of the Manu-Amarakaeri road, which has been in progress since 2015, was described in 2017 in a report by the newspaper Ojo Público (REF) rewarded by the Inter American Press Society, which highlights the institutional, economic and demographic factors that intermingle

to define the fate of many hectares of forest. The hectares in question are located in the buffer zone of the Amarakaeri Communal Reserve protected for its ecological value. The institutional factors in this case are double because while the national institutions refused the construction of the road, only one prosecutor and 12 forest rangers were assigned to ensure the application of the ban, and they did not manage to prevent the regional governor from getting the works carried out anyway with the support of a part of the local population. For these indigenous communities, the motivation is both economic and socio-cultural – the construction of a road is seen as a means to develop commercial activities, tourism and access to better medical and educational services. The same economic reasons are driving people in indigenous communities to participate in the illegal mining of gold and timber. Estimates for timber logging around the road are 80 m<sup>3</sup> per week and by maintaining the current rate of progress of the road, it would mean that 43,000 hectares of forest could be lost by 2040.

### 3 • THE MANY TYPES OF BATTLE AGAINST DEFORESTATION

• **RESEARCHERS AND NGOS ORGANISE REAL-TIME MONITORING OF DEFORESTATION** • Spatial and aerial imagery has become a key element in the fight against deforestation in recent years thanks to collaboration between researchers, NGOs and public institutions that have developed a range of operational tools and broadcast platforms. Two main tools are now in use in Peru. The Department of Global Ecology of the Carnegie Institution (USA) has been developing CLASLite since 2009. It compares two successive images coming mainly from the Landsat satellite to convert them into deforestation and forest degradation maps (Asner, Knapp, Balaji & Pérez-Acosta, 2009). The GLAD alert system developed at the University of Maryland (USA) also uses images from Landsat satellites at a 30 m resolution but automatically searches all Landsat archives for changes in forest cover and produces weekly alerts. Advances in the field of imaging are numerous and fast, and the current limits are slowly being lifted as the cost of very high resolution imagery is becoming affordable and cloud cover is dealt with by using data from European satellites Sentinel-1 and 2 at a 10 m resolution and radar bands that are provided for free.

The tools for detecting deforestation provide very rich raw data, but at the scale of a country the size of Peru, their interpretation is essential to make sense of them. The statistical treatment of deforestation maps, the use of very high resolution images or the survey of specific areas by drones are some of the methods used to identify the type of deforestation detected by the algorithms. For example, roads cleared for timber extraction are difficult to detect on their own because few trees are cut down, but algorithms can identify the small straight line variations characteristic of forest roads. Data processing and dissemination of results is done in part by the developers, as is the case with the online platform of Global Forest Watch, a GLAD partner that has implemented a mobile app giving access to alerts from the field and allowing users to contribute by sharing their

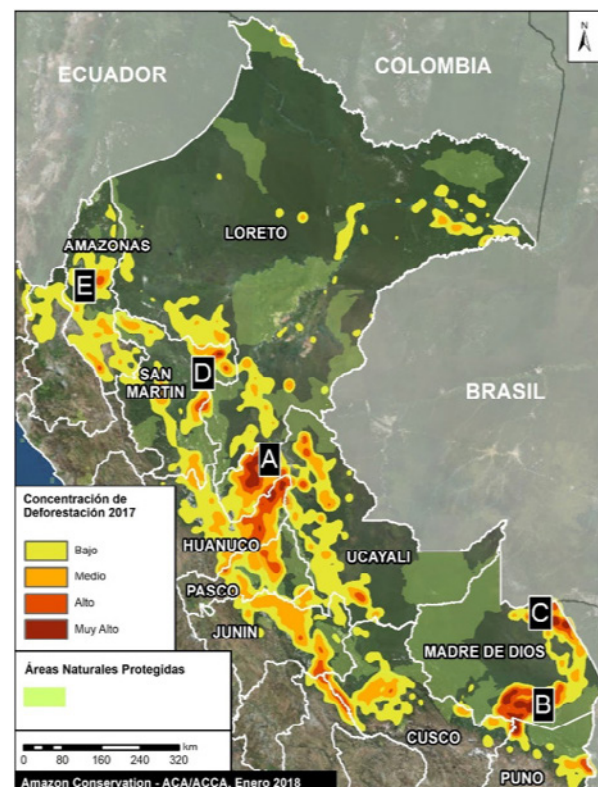


FIGURE 2. MAP DEVELOPED BY MAAP SHOWING THE HOTSPOTS OF PERUVIAN DEFORESTATION IN 2017



reports. The Peruvian Ministry of the Environment also uses GLAD alerts for its official Geobosques deforestation monitoring portal, which is intended as a tool to support political decision-making and awareness-raising and information for citizens. Users have access to the latest reports on deforestation in the country and, following registration, they may choose to receive continuous alerts or weekly newsletters for areas of their choice.

MAAP (Monitoring the Andean Amazon Project) whose website was launched in April 2015 by the NGO alliance of Amazon Conservation Association and Acca-Conservación amazónica is specialised in analysing the causes of deforestation events in the field. Their weekly reports point out concrete cases by showing high resolution images of the same area, for example, before and after the installation of a mining area. By decoding trends, hotspots (Figure 2), and the main causes of deforestation, MAAP's objective is to provide visual, easy-to-understand and high-quality technical information on deforestation in near real time.

• **THE ROLE OF LOCAL AUTHORITIES** • The process of decentralisation is underway in Peru as defined by a 2002 law that sets out the transfer of jurisdiction from the national level to the regional and local levels. On the environmental level, regions are responsible for controlling the use of natural resources in their territory and issuing permits, authorisations and concessions, and monitoring forest law enforcement. One of the functions of regional governments in this process is to achieve forest zoning and territorial planning (SERFOR, 2016) as a technical tool to support decision-making. Forest zoning consists in assigning one of four categories to each forest parcel in the region as defined by the national forest service SERFOR: ecological protection and conservation zone, permanent production zone, restoration zone, zone of special character (including reserves for indigenous peoples and areas of agroforestry or silvopastoralism). The criteria used to define the parcel categories are, for example, the type of forest (wet, dry, plain, mountain), the presence or absence of fragile habitats or the estimate of the volume of wood in the parcel. This classification should allow the regional governments to know the potential and limits of the use of the natural resources in their territory and to legally regulate the uses to avoid frequent conflicts between local population and mining operations or migrant farmers while limiting illegal practices. Zoning is driven by regional and local governments with the technical support of SERFOR, and is based on a participatory process through workshops that bring together local decision-makers, members of ministerial services and local communities. Since August 2018, the "national mosaic of satellite images" provides a map of the country's forests for free for both citizens and decision makers at a 1.5 m resolution composed of images of the French SPOT satellite from 2016 to 2018. One of the satellite's priority missions is to simplify forest zoning to accelerate its implementation. Out of 25 regions, by the end of 2017 only 4 regions had started properly zoning (Reaño, 2018).

• **REDD+ – FRAMEWORK OF PREFERENCE FOR ACTION BY NON-STATE ACTORS** • REDD+ (Reducing Emissions from Deforestation and Forest Degradation) is a programme of the United Nations providing funding for forest protection by allocating carbon credits that can be sold on the carbon market. In Peru, the national REDD+ strategy is currently in the process being defined under the coordination of the Ministry of the Environment. The government has chosen a nested approach, i.e. a combination between national scale and local scale, in line with the ongoing decentralisation in the country. Approximately 30 local or regional projects have already been voluntarily funded by private players, NGOs or by international cooperation (Althelia Text box), which should help to inform the definition of the national Peruvian REDD+ strategy by providing reference emission levels and tools for monitoring, reporting and verification. However, this multi-scale approach raises questions. Some REDD+ projects date back to 2008 when there was still no national REDD+ plan, and each project developed its own methodology, baseline and measurement criteria. These disparities complicate integrating these projects into a single national reference level of forest emissions, which is a prerequisite for the national REDD+ framework. The government's current plan

is to use historical data from 2001–2014 to establish this national reference level. Project-focused NGOs are critical of this approach because it does not reflect possible increases in deforestation in the future under socio-economic pressures and therefore minimises avoided emissions.

In parallel with these reflections, REDD+ projects continue to develop independently of the national strategy within the framework of the voluntary carbon market. In this case, projects can apply for certification and thus generate carbon credits that are sold on the voluntary carbon market mostly for communication purposes to companies not subject to quotas.

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### **Althelia**

On 21 May 2018, Althelia – a management company owned by a subsidiary of Natixis Bank specialising in investments impacting the natural resources sector – announced that two REDD+ projects financed by it will be integrated into the national commitments vis-à-vis the Paris agreement. In more concrete terms, it is a world first in which the nested approach by which projects developed by private actors guide the strategy and the national objectives is more concretely defined. The carbon credits generated by these two projects between 2015 and 2018 will therefore be logged in the country's emissions register, and project emission reductions will become part of the national baseline starting in 2018.

The Cordillera Azul National Park project was created to preserve an area of 1.3 Mha of primary forest located at the intersection of the Andes and the Amazon basin – the largest protected areas in the country. The project consists in supervising the forest management practices in the buffer zone of 2.5 Mha around the national park. Preserving the park has three simultaneous objectives. First, avoiding the emission of 15 Mt CO<sub>2</sub> in 6 years by preventing deforestation and forest degradation. Then, protecting the unique biodiversity that lives in the heart of the park with more than 6,000 species of plants, 600 species of birds and 80 species of large mammals, 11 of which are endangered species. And finally, providing

support to the approximately 400 indigenous communities in the buffer zone living on food crops in order to develop sustainable agroforestry systems of both food crops such as banana or cassava and cash crops such as coffee and cocoa. This project is based on the collaboration between the private Althelia Climate Fund in charge of financial aspects in the form of a loan of €8.55 million over 6 years repaid by the sale of the generated carbon credits and the Peruvian NGO CIMA-Cordillera Azul responsible for surveillance, biological monitoring, research activities as well as improving the skills of institutions and local populations. The Tambopata-Bahuaja reserve REDD+ project is supposed to avoid the emission of 4.5 Mt CO<sub>2</sub> in 7 years. The collaboration of Althelia with the Peruvian NGO AIDER and the National Service of Natural Protected Areas providing funding of \$12 million over 5 years should allow the preservation of 570,000 ha of forest in the area of Madre de Dios. The project focuses on two axes: developing the economic activity of local communities and protecting biodiversity. In 2014, 249 ha of agroforestry systems and 70 nurseries had been created thanks to funding from the project for technical and commercial support and the establishment of cooperative sales structures for production. Fauna and flora monitoring in the area as well as a patrol against illegal logging were also set up.

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TEXT BOX 5



## CONCLUSION

In conclusion, in recent years the Peruvian government has set up a rich institutional and legislative framework that should increase the government's capacity in its fight against deforestation. However, this regulatory framework, is fragile in the face of the economic interests of local actors and the lack of cohesion between the different layers of government to enforce laws. Civil society plays a key role in stimulating environmental action by developing local forest conservation projects and developing alternatives for their sustainable exploitation and tools for monitoring deforestation. The link between local initiatives and the national framework will be crucial in the coming years for maintaining a dynamic that is currently still struggling to produce results.

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# Ivory Coast winning back its forests

In the country's Intended Nationally Determined Contribution (INDC), submitted in preparation for the COP 21 in 2015, Côte d'Ivoire signaled its intention to reduce gross GHG emissions by 28% by 2030 compared to 2012 levels. Due to the lack of precise data and measurement difficulties, emissions from land use, land use change and forestry (LULUCF) were not specifically included in the low carbon scenario, but have since become the subject of greater attention at the national and international levels. The interest in this issue is due to the fact that Côte d'Ivoire based its development on agricultural expansion, which is the primary factor behind the loss of 3/4 of the country's forests: in 2015, the country had 3,401,146 hectares of forests, down from 16 million hectares in 1900. Forest recovery is a priority for the country, not only in order to meet its international commitments in terms of reducing GHG emissions, but also to preserve local socio-economic and environmental conditions. Furthermore, building and adhering to sustainable strategies is now seen as essential for this developing country, which hopes to continue its strong growth record. NGOs, companies and local communities working in partnership with state bodies are undertaking to help alleviate the catastrophic decline of Ivorian forests. This study on emissions from Côte d'Ivoire's LULUCF sector provides an overview of the trends and causes, while also highlighting the various operators being mobilized to recover the country's forests

Head editor • AÏCHA KONÉ • *environmental sustainability consultant*

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## 1 • CLIMATE CRISIS AND MAJOR SOCIO-ECONOMIC ISSUES

Climate change is a major issue for Ivory Coast: according to the World Bank's recent 2018 report on the country, its vulnerability index is among the highest in the world (147th out of 178). The economic impact of climate change on the country is estimated at a loss of between 380 - 770 billion CFA Francs by 2040 (in constant 2017 value). Although the average Ivorian citizen emits 10 times less atmospheric CO<sub>2</sub> than the global average, mitigation and adaptation remain key priorities for the country.

Several changes have already been observed in the national climate, notably including lower and more irregular rainfall, shorter rainy seasons, and a temperature rise of 0.5°C since the 1980s (Djé, 2014). In addition, an average temperature increase of 2°C is forecast for the entire country by 2050, along with rainfall variations and a sea level rise of 30cm along the country's coastline (World Bank, 2018).

The LULUCF sector has strong socio-economic influence, as it depends on one of the country's primary natural resources: its forests. This resource has enabled national growth via wood exports and soaring agricultural development, on which 2/3 of working-age Ivorians depend for their livelihood. The country's forests sustain many rural families through harvesting-gathering, sale of non-timber forestry products, hunting, medicinal and pharmaceutical products and casual work (MINSEDD, 2017). In a country whose poverty rate was 46.3% in 2014 (10,497,000 individuals living below the poverty line, 6 million of whom live in rural areas), any discussion of the LULUCF sector requires climate concerns to be addressed in tandem with underlying social and economic issues.

## 2 • REDUCTION OF EMISSIONS IN THE LULUCF SECTOR

The LULUCF sector was the main source of emissions over the 1990-1995 period, representing 49% and 61% respectively of net national emissions (Graph 1). Over the 2000-2012 period, the sector became a carbon sink, absorbing more CO<sub>2</sub> than it emitted (with the exception of 2011, during which it accounted for 15% of net national emissions). Given that the most recent data for the country dates from 2012, it has not been possible to provide a more up-to-date assessment.

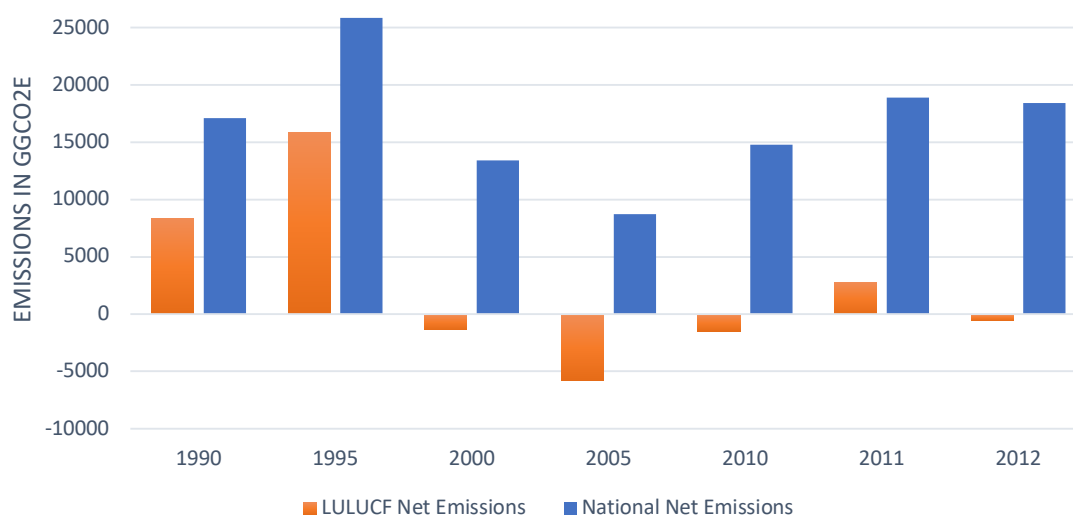


FIGURE 1. EVOLUTION OF LULUCF EMISSIONS

Data source: MINSEDD, 2017

The contribution of the LULUCF sector to net national emissions has waned over time due to its high absorption levels. Emissions from the LULUCF sector stood at 8,402.77 GgCO<sub>2</sub>eq in 1990, compared to -548.29 GgCO<sub>2</sub>eq in 2012, while national net emissions were 17,077.59 GgCO<sub>2</sub>eq in 1990

and 18,409.02 GgCO<sub>2</sub>eq in 2012. In 2012, the main emissions sectors were (in order of significance): Energy, Agriculture, Waste, Industrial processes and product uses, and finally LULUCF.

### 3 • DIVERSITY OF CAUSES AND PREDOMINANCE OF AGRICULTURE

• **DEFORESTATION IN FIGURES** • Deforestation, which is the principle cause of emissions in the LULUCF sector, has taken place at such a frantic pace in Ivory Coast that forests have become a much rarer resource. Estimated at 16 million hectares in 1900, the forest cover had fallen to 7,850,864 ha in 1986 and 3,401,146 ha in 2015 (Graph 2).

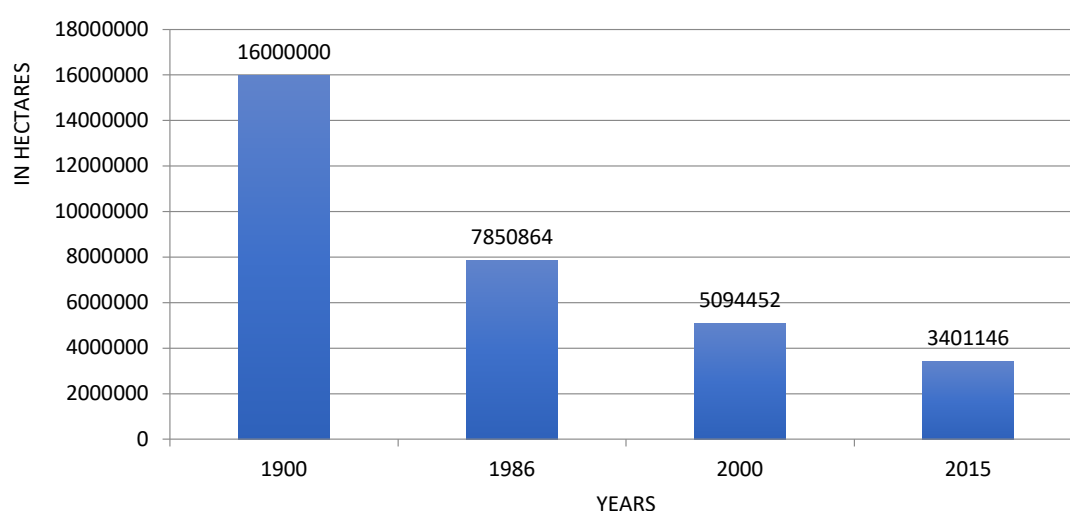


FIGURE 2. EVOLUTION OF FORESTED SURFACE AREA IN IVORY COAST

Data Sources: SEP-REDD+ Côte d'Ivoire (2017) and REDD+ Côte d'Ivoire (2017)

The pace of deforestation has decreased over the years: 183,760.78 hectares of forests were converted into other types of land use each year over the 1986-2000 period, compared to 112,887.05 hectares per year over the 2000-2015 period (SEP-REDD+ Côte d'Ivoire, 2017). One of the causes of this slowdown is the increasingly rarefied nature of forestry resources as forest clearance proceeded. In total, the country has lost 78% of its plant cover. Consequently, this loss of forested land has largely contributed to the LULUCF sector's lower contribution to national emissions over the 2000-2012 period (Graph 1).

Today, the remaining forestry resources are largely contained within protected areas. In 2015, 64% of Ivorian forests were located within protected zones and listed forests. However, current deforestation hotspots are localized within listed forests, where the annual rate of deforestation was 3% over the 1990-2000 period and 4.2% over the 2000-2015 period. In 2015, 844,938 hectares of listed forests remained, compared to 1,585,626 hectares in 2000 and 2,129,729 hectares in 1990. The surface area of protected zones fell from 1,406,676 hectares in 1990 to 1,323,685 hectares in 2015. (REDD+ Côte d'Ivoire, 2017; Koné, 2018).



• **DISPARITY OF INVOLVEMENT LEVELS AND DEFORESTATION STAKEHOLDERS** • Compiled by the NGO Etc Terra as part of the REDD+ program, the report of the Qualitative analysis of deforestation and forest deterioration factors in Ivory Coast helped identify the main factors in deforestation and forest deterioration, based on a survey of 394 individuals. These factors are organized into two categories: direct factors (Table 1) and indirect factors.

Direct factors in deforestation	Proportion %	Evolution over the 1986-2015 period:
<b>Agriculture</b>	<b>62</b>	<b>↗</b>
Cacao farming	38	↗
Natural rubber farming	23	↗
Palm farming	11	↗
Cashew plantations	7	↗
Food crops	6	↗
Rice farming	5	↗
Coffee farming	5	↘
Other cash crops	4	→
<b>Logging</b>	<b>18</b>	
Clear-cut logging > 1000m <sup>2</sup>	64	→
Production of charcoal	36	↗
<b>Infrastructures</b>	<b>10</b>	
Habitat (rural, urban)	94	↗
Transport	6	↘
<b>Mining</b>	<b>8</b>	<b>↗</b>
Artisan gold panning	80	↗
Industrial gold panning	20	↗
<b>Bush fires</b>	<b>3</b>	<b>→</b>

TABLE 1. DIRECT FACTORS IN DEFORESTATION IN IVORY COAST

Data sources: Etc, Terra & Al. (2016); SEP-REDD+Côte d'Ivoire (2017)

### Government, multinationals and farming

Agricultural activity was identified as the main cause of deforestation in Ivory Coast (responsible for 62%). Table 1 highlights the critical role played by agricultural exports, represented by key products such as cacao, rubber, palm oil and cashews. This role is not surprising given the country's economic policy and the characteristics of Ivorian agriculture.

Indeed, Ivory Coast's economic development policy has long been focused on its agricultural sector, and more precisely on agricultural exports. Between 1960 and 1978, the period of the "Ivorian

economic miracle”, economic growth was strongly linked to the boom in coffee, cacao and wood exports (Cogneau & Mesplé-Somps, 2002). It was during this period that Ivory Coast became a middle-income country. Forests were cleared away in order to make room for export crops. Coffee, cacao and wood made up 82% of exports in 1965, and 74% in 1972 (Cogneau & Mesplé-Somps, 2002). Although agricultural products now account for a smaller portion of national exports, overall export volumes are rising. In 2017, agricultural exports still accounted for 9.2% of Ivorian GDP (Ministry of Economy and Finances, 2017). Ivory Coast is the world’s largest producer/exporter of cacao (40% of global export volumes), cashew nuts and cola, and is also the largest African exporter and seventh-largest global exporter of natural rubber. It is the largest African producer/exporter of dessert bananas, the second-largest African producer (ninth-largest global producer) of palm oil, and the third-largest African producer of cotton and coffee. Agricultural exports and an agricultural model still largely based on extensive farming are therefore implicated: the area covered by cacao plantations, for example, rose from 1,566,500 hectares in 1990 to 2,693,904 hectares in 2012 (FAO, 2018; Koné 2018). However, the environmental impact of deforestation presented in these figures must also be put into perspective, since the expansion of agricultural areas does not mean plant eradication, but rather reconversion.

The private sector plays a decisive role in Ivory Coast’s agricultural success. However, it has been criticized for its role in deforestation, as evidenced by the frequent controversies surrounding chocolate (text box 1) and palm oil (text box 2).

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### ***Deforestation and the chocolate industry in Ivory Coast***

In its report entitled *Chocolate’s Dark Secret*, released in 2017, the NGO Mighty Earth denounced the chocolate industry for its role in causing deforestation in Ivory Coast, notably in the clearing of protected zones and national parks. A study cited in the report, carried out by the University of Ohio along with Ivorian researchers, concluded that of 23 protected zones, 7 had been almost entirely converted into cacao cultivation areas. As a result, according to SODEFOR, 40% of Ivory Coast’s cacao production comes from protected areas. The inquiry accuses the major cacao traders (Olam, Cargill and Barry Callebaut, which account for almost half of the global market) of buying cacao sourced from these protected areas, before selling it on to the major multinational

chocolate producers and distributors (Mars, Ferrero, Nestlé, Mondelez, etc.). The supply chain begins when farmers illegally set up operations in these protected areas, clearing the forest and planting cacao crops, before selling their produce to traders who go on to sell to chocolate companies. The traders and chocolate companies admitted to the researchers that they were aware that some of their cacao was sourced from protected zones. The report’s findings support the ambition demonstrated in the Collective Statement of Intent drafted by the sector in March 2017 at the initiative of the Prince of Wales Foundation, followed by the implementation of a framework for action in November 2017 (cf. section 4.3) in order to end deforestation and forest deterioration.

TEXT BOX 1

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### **Deforestation and palm oil in Ivory Coast**

Palm oil is the most productive oil crop in the world, producing around 35% of the world's vegetable oil despite occupying less than 10% of land allocated to oil crops. The palm oil industry has been the target of international criticism, causing repercussions within Ivory Coast. According to the International Union for the Conservation of Nature (IUCN, 2018), on a global scale palm oil crops are responsible for less than 0.5% of deforestation, but in certain areas of the tropics this figure can rise to 50%. While most of the debate surrounding deforestation caused by palm oil is focused on Asia, as the 9th-largest global producer and 2nd-largest African producer of palm oil, Ivory Coast is very much involved in this issue. In Ivory Coast, 60 - 65% of production comes from small farms, occupying some 175,000 hectares (Commodafrica, 2017). Industrial plantations are therefore not the majority producers in the country. According to the figures for direct factors in deforestation, oil palm plantations are the third-biggest cause of agricultural deforestation (11%), some way behind cacao plantations (38%) and rubber (23%).

TEXT BOX 2

The role of small producers in deforestation is highlighted in text boxes 1 and 2: they are the foundation of the supply chain. The analysis of indirect drivers of deforestation in the country underlines the role of economic factors (36%), political and institutional factors (35%, and 53% for forest deterioration), as well as demographic (24%), technological (4%) and cultural factors (1%) (Etc Terra, 2016). Accordingly, aside from the scandals and industrial groups targeted, it is a combination of the economic attractiveness of crops (higher revenues and more regular earnings, etc.) in a context of high poverty rates (46.3%), rampant demographic growth (2.55% per year), inefficient application of the law (due or not to political crises), and a low level of technical control that leads producers to convert forests into new plantations.

Among the institutional and political factors behind deforestation (35%), war and economic crises (34%) as well as ineffective or non-application of laws (28%) seem to provide the most fertile ground for the proliferation of illegal activities, including by agents of the State. "Corruption/ complicity" on the part of State departments, the Ministry of Waterways and Forests, or local political leaders was cited by 15.9% of respondents as an indirect factor in forest deterioration, and by 5.2% in deforestation (Etc Terra, 2016). While local media coverage of these cases tends to be erratic and unequal, in August 2018 the Ivorian government ensured widespread media coverage of the suspension of 5 agents, via ministerial order, from the Regional Directorate of Waterways and Forests in the Gbêkê region for the offences of wood trafficking and clandestine gold panning activities.

### **Timber industries, illegal operators and urban households**

Logging represents around 18% of all deforestation (table 1), a large proportion of which involves clear-cutting. Despite the increasing rarity of quality timber, leading to a drop in exports and factory closures, the timber industry still exerts pressure on forests, leading industrial groups to work with lower-quality wood and therefore trees with smaller diameters. Companies operating legally in the timber sector are also competing with illegal operators. Illegal timber production, which relies on small-scale processing techniques to transform raw wood into semi-finished products, using chainsaws, portable sawmills or other similar materials at a cutting site, bypasses the legal timber industry. This informal sector consumes, for example, 3 million m<sup>3</sup> of logs per year (2011), or triple the amount used by the industrial export sector. (Louppe, 2013; REDD+ Côte d'Ivoire, 2017)

The amount of wood attributed to the production of charcoal is lower, but on the rise. The production of wood charcoal rose from 400,850 tonnes in 2003 to 488,128 tonnes in 2012, in order to

satisfy demand from a growing and increasingly urbanized population. Indeed, charcoal is one of the main domestic energy sources in Ivory Coast, particularly in urban areas where it is used by 47% of households (compared to 35% for wood burners and 18% for butane gas). In rural areas, it is used by only 4% of households (95% use wood burners and 1% butane gas) (PNUD, 2015). This consumption of wood energy, particularly charcoal, leads to pressure on forestry resources and represents a threat to the country's remaining forests, especially given the rate of demographic growth (MINSEDD, 2017).

### **Mining industries and traditional gold panning**

Mining operations are the cause of 8% of deforestation in Ivory Coast, and this rate is increasing. Traditional placer mining is the main cause of this type of deforestation; it is estimated to cause 80% of mining-related deforestation compared to 20% for industrial gold mining.

According to the Ministry of Planning and Development (2016), two industrial companies currently mine for gold and two others for manganese. Industrial production reached 18.4 tonnes of gold and 308,401.78 tonnes of manganese in 2014, up from 12.4 tonnes of gold and 50,000 tonnes of manganese in 2011. According to REDD+ Côte d'Ivoire (2017), 140 mining research permits were issued in 2015, of which eight were for gold and three for manganese, and many of which involved prospecting in listed forests. In addition, industrial mining operations contribute to deforestation via the use of surface mining (open cast) techniques. This situation is often exacerbated by the failure to reforest areas used for mining. In addition to industrial operations, unsanctioned small-scale extraction is also on the rise for gold and diamonds (traditional placer mining), which saw a significant uptake and extension into national parks and listed forests during the Ivorian socio-political crisis of 2002-2011. In 2016, around 22 tonnes of gold were illegally exported (Abié, 2018).

### **Bush fires**

Bush fires account for 3% of deforestation in Ivory Coast (table 1). While climate conditions - especially the prolonged and harsh dry season - are a primary factor in the scale of these fires, their causes and origins remain largely man-made: most fires originate from the practice of shifting cultivation by rural farmers, in order to prepare their lands for crops and hunting (Durrieu de Madron, Gballet and Balou Bi, 2015). In 2016, bush fires killed 17 people, destroyed 10 villages, decimated 1,100 ha of forests, destroyed 15,000 ha of crops, and caused major material damage estimated at over 204 bn FCFA, or €365 m (official government portal, 2018).

## **4 • ACTIONS TO REDUCE EMISSIONS FROM THE LULUCF SECTOR**

• **THE LULUCF SECTOR AT THE HEART OF NATIONAL POLICY** • Ivory Coast has been a member of the REDD+ international organisation since 2011. In concrete terms, REDD+ in Côte d'Ivoire aims to reduce deforestation and deterioration of listed forests, and to win back 80% of protected zones compared to 2015 levels, which equals a reduction of 74,400 ha per year. REDD+ is also seeking to reconstitute the country's forest cover through agroforestry practices, by planting 5,000,000 hectares by 2030 (REDD+ Côte d'Ivoire, 2017). The country also entered into a Voluntary Partnership Agreement for Forest Law Enforcement Governance and Trade (VPA-FLEGT) with the European Union in 2013, with the objective of effectively combating illegal logging and timber production and associated trading operations. In 2014, Ivory Coast signed up to the New York Declaration on Forests (NYDF), which aims to end deforestation by 2030. The objectives of the NYDF include the ambition to eliminate deforestation caused by supply chains in the agricultural industry and other economic sectors. During the 2014 World Climate Summit at the UN, Ivory Coast committed to transitioning towards zero-deforestation agriculture from 2017 onwards. This type of agriculture is more productive in terms of rural real estate, preserving parks and reserves, listed forests, and forests with special characteristics, as well as contributing to the restoration of forest cover in



order to partially compensate for previous deforestation. It is also more resilient to the impacts of climate change, and respects the rights of local communities while also improving their sources of livelihood.

In all these commitments, a major focus has been the necessity of improving forest governance in Ivory Coast, as thus far none of the country's existing forest policies have been correctly applied. In 1988, the Ivorian government adopted a Forestry Master Plan (PDF) for the 1988-2015 period. Observing that the plan was failing, in 1999 the government adopted the Forest Policy Declaration, which was not applied due to the sociopolitical crisis (REDD+ Côte d'Ivoire, 2017). In 2014, a new forestry code was adopted, but so far this has also not been applied (APA, 2018). Given the catastrophic effect these failings have had on the nation's forest cover, a new national policy for the preservation, recovery and extension of forests was introduced by the government in May 2018. Based around realistic voluntary commitments, it has four objectives: preservation of biodiversity, preservation and reconstitution of a national climate favourable to agricultural activity and living spaces; compliance with international commitments, and economic and social development. In this new forestry policy, four of the six key strategic topics involve listed forests. They also introduce the concept of Agro-forests, which refers to listed forest zones in which agroforestry may be practiced (Ministry of Waterways and Forests, 2018). Finally, in July 2018, the Minister of Waterways and Forests, Alain-Richard Donwahi, also announced an investment plan worth 616 bn FCFA (€940 m) over 10 years, in the form of public-private partnerships aiming to achieve a commitment to restore 20% of the country's forest cover.

• **THE CENTRAL ROLE OF REDD+** • The REDD+ organisation plays a central role in the implementation of the national strategy to combat climate change in Ivory Coast. In Ivory Coast, its ambition is to stabilize and sustainably reverse the trend of natural forest disappearance from 2017 onwards, and to simultaneously restore 20% of forest cover by 2030. The next stage involves managing these forests in a sustainable fashion, while also achieving its goals in terms of poverty reduction, human and social development in local communities (social equality), culture and gender equality. Following the completion of the preparatory phase, during which the country developed its REDD+ strategy in partnership with public bodies, the private sector and organisations from civil society, REDD+ Côte d'Ivoire is now in its second phase: strategy implementation. According to REDD+ Côte d'Ivoire (2017), this strategy is based on an approach that is integrated, landscape-orientated, multi-sectoral, transparent, robust, participative and inclusive, in order to make the strategy as efficient as possible. As a result, non-governmental stakeholders will play a significant role in the implementation of this national strategy (Table 2).

	Direct factors in deforestation					Indirect factors and obstacles		
	1	2	3	4	5	6	7	8
<b>Strategic options</b>	Zero-deforestation agriculture via public-private partnerships	Sustainable domestic energy, with monetization of agricultural biomass	Sustainable management of listed forests, and conservation of protected zones and sacred forests	Wooding / reforestation, restoration of forests and damaged landscapes	Environmentally-friendly mining operations	Incentive schemes such as Payment for Environmental Services (PSE)	Regional development and land security	National planning and structural reforms for the transition to a green economy

TABLE 2. APPROACHES AND STRATEGIC OPTIONS FOR REDD+ IN CÔTE D'IVOIRE

Source: REDD+ Côte d'Ivoire (2017)

• **EXAMPLES OF ACTIVITIES IN CIVIL SOCIETY, THE PRIVATE SECTOR AND LOCAL COMMUNITIES** • Several non-governmental bodies are involved in the fight against deforestation: Local and international NGOs, multinationals, local communities, etc. These groups carry out

studies on deforestation (such as the previously-cited Mighty Earth report or the Etc Terra study), and actively participate in the fight against bush fires (text box 3).

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### ***Progress of knowledge***

Scientific research has for long looked into deforestation in Ivory Coast. If several scientific articles have made possible to establish a global picture, NGOs also are also taking part in extending knowledge on deforestation in Ivory Coast. With financial support of FAO within the frame of ONU-REDD and in collaboration with REDD+ and other State actors and civil society, the NGO Nitidæ (merging of

the NGOs Etc Terra and Rongead) carried out in 2016 a qualitative analysis of the factors of deforestation and degradation of forests in Ivory Coast. The results of this landmark study, largely quoted in most of national and international reports have improved the understanding of the drivers of deforestation. (Etc Terra, 2016)

TEXT BOX 3

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### ***Preventing bush fires***

The fight against bush fires is also a hobby horse for local communities. Over 1000 committees have been set up to prevent bush fires, such as Boman Gouli in Oumé or Ebo Agnan Iti in Abengourou; these organisations are made up of local villagers, and are supported by the SODEFOR and the International Tropical Timber Association (ITTO) (AIP, 2018). These committees have been set up in villages to increase awareness of the dangers of bush fires, to prevent fires from being started, limit their spread and make containment efforts more effective.

TEXT BOX 4

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Chasing farmers, placer miners and loggers off protected forest lands is a sensitive issue for the Ivorian government. In certain places, these protected areas have become functioning villages with their own infrastructures: schools, hospitals, water and electricity systems, etc. For this reason, several NGOs are involved in the upstream and downstream phases of these operations (text box 4). Ivory Coast has 234 listed forests (SODEFOR, 2018). These forests have long been illegally infiltrated following migration into forested areas: 80,404 people settled in forests between 1996 and 1999 (CEDEAO, 2015). These occupations were exacerbated by the period of socio-political crisis between 1999 and 2010: almost 229,560 heads of families are now settled in the forests, and depend on them for their survival (REDD+ Côte d'Ivoire, 2017). These forests are often the subject of land disputes, as was the case for Goin-Débé in the west of the country. Clearing human settlements from these areas is a necessity in order to meet the commitments the government has entered into. Around 9,000 people have been removed from the Mount Peko national park (OCHA, 2013) and over 10,000 people have been removed from the Niégré listed forest (Léonard & Ibo, n.d.).

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### ***Combating the illegal occupation of listed forests and protected zones***

For several years now NGOs have been raising awareness among the population of the benefits of preserving listed forests and protected zones. For example, in 2017 the wild chimpanzee foundation (WCF) initiated an awareness drive in villages around the listed forest of Cavally, using a theatrical





production to spread their message. The play showed viewers what kinds of things were happening in listed forests: people entering illegally, armed gangs bringing in and extorting illegal occupants, who clear the land to make way for cacao plantations - all with the complicity of certain local officials who encourage these practices and contribute to the destruction of the forest. This awareness campaign was designed to support the emergency plan implemented by the SODEFOR (a government agency), which enables surveillance operations to be carried out each month in listed forests, including the destruction of shelters and plantations in the Cavally forest, and the arrest of clandestine occupants. Several local NGOs such as Nofna, Oprft, and IDEF are also working with government authorities and international NGOs to raise awareness amongst the population. (Diédri, 2017)

These clearances often attract fierce criticism, as one of the immediate consequences is the overpopulation of neighbouring villages and the various issues this causes. The government's lack of support measures for these cleared populations (and slowness in providing them) are also criticized. As a result, these populations are often tempted to resettle back in the forests. In a recent incident report, the Ivorian Association of Human Rights Bodies (RAIDH, 2017) revisited these points, reiterating the rights of these occupants during evacuations, and called upon the government to recognize the necessity of improving support measures in order to facilitate the re-integration of these populations. The challenge therefore lies in retaking control of these protected areas and listed forests while also taking into account the social and economic impact of settlement clearances.

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**TEXT BOX 5**

In response, the new forest policy transforms the government's method of intervention in these areas. The policy suggests redeveloping forests having suffered deterioration levels of over 75% into agro-forests. In these listed forests, environmentally-friendly agricultural activities will be permitted (under clear and strict conditions), as will other controlled economic activities and human settlements. Development plans will be implemented in order to preserve and re-wood existing forests. For forests that have experienced lower levels of deterioration, settlement clearances will be carried out in adherence with human rights regulations. (Ministry of Waterways and Forests, 2018).

Within the strategy implementation framework, REDD+Côte d'Ivoire has established several pilot projects, which are being managed by NGOs (text box 5). The private sector is also involved in one of these projects. Elsewhere, civil society organisations and private bodies have created a coalition to push forward the application of the new forestry code (text box 6).

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**Implementation of several REDD+ flagship pilot projects**

The REDD+ Project in the Mé region (in the south-east of Ivory Coast) is currently being coordinated by the NGO Nitidæ (which was formed via the merger of Etc Terra and Rongead). This is the first REDD+ project in Ivory Coast. Its aim is to combat deforestation and forest deterioration on a regional scale in the Mé. The scope of this pilot project covers the listed

forests of Mabi-yaya and their surrounding buffer zone. It will benefit 7 villages, 2250 planters, 5000 hectares of plantations, 150 forest owners, 15 charcoal producers, 5 NGOs and 3 local companies. The project, which has been underway since December 2016, has already achieved significant progress, including the mapping of land use in the region, increasing awareness of land use and forestry legislation, reforestation of 58 hectares of land and the

establishment of a reference level for forests in the region. (Nitidæ, 2018)

A Payment for Environmental Services (PSE) pilot project has been implemented by the NGO Impacture since September 2017 in the region of Nawa (south-east of Ivory Coast, and part of the "cacao triangle"). The PSE, which is an incentive instrument implemented by REDD+, aims to create a collective dynamic among local communities to support the reforestation and conservation of biodiversity in the area's remaining forests. The project has already increased awareness among 2000

producers and community members. Almost 600 producers and community members have been mobilized in agroforestry, reforestation and forest conservation, and 200 contracts have already been signed. 79% of the funding for this project was provided by the chocolate company Mondelez, which was singled out by Mighty Earth; its aim is to improve the environmental quality of this multinational chocolate company's supply basin. (REDD+ Côte d'Ivoire, 2018).

TEXT BOX 6

At a level applying to all agricultural sectors, several actions have been carried out in pursuit of the "zero-deforestation agriculture" policy. Applying to the cacao sector, for example, in November 2017 (alongside the COP23) a group of 22 multinationals from the cacao and chocolate industries signed a "Communal Action Framework for a deforestation-free cacao value chain". In partnership with the Ivorian government and NGOs, they will commit to working together to pursue shared objectives in order to end deforestation and forest deterioration throughout the global cacao supply chain. The Ivorian ministers of the environment, waterways and forests launched work on this action framework on January 18th 2018 in order to establish a roadmap to zero-deforestation objectives for the sector.

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### ***Pushing for effective application of the new forestry code***

Initiated by the NGO Impactum, a coalition of organisations from civil society and the private sector was created in August 2018 to incite the government to fully apply the new forestry code adopted in 2014. This coalition also includes the NGOs OPRFT (Observatory for the Protection and Recovery of Tropical Flora and Fauna), AMISTAD, SAFI (Save the Ivorian Rainforest), IDH, UTZ Certified and Rainforest Alliance (Kouassi, 2018). The coalition aims to promulgate the forestry code and help ensure its widespread application. The ultimate goal of this push to effectively apply the code is to encourage producers and local communities to participate in the recovery and conservation of the country's forest cover (APA, 2018).

TEXT BOX 7

By giving companies public and symbolic recognition of their positive agricultural practices and forest preservation efforts, the Rainforest Alliance, UTZ Certified and "Fair Trade" certifications also have a role to play in making producers more responsible and increasing consumer awareness. In 2017, a total of almost 330,000 cacao producers carried the UTZ certification (UTZ, 2018), and 120,000 producers were certified as "Fair Trade" (Le Monde, 2018). According to Ouattara (2015), 206 cooperatives carried the Rainforest Alliance certification in 2013. As regards the palm oil sector, the country has joined the Africa Palm Oil Initiative (APOI) set up by the Tropical Forest Alliance 2020 (TFA2020, 2018). The sector has also committed to a sustainable production approach via the RSPO industrial standard (Roundtable on Sustainable Palm Oil).

## CONCLUSION



This study of LULUCF emissions in Ivory Coast has demonstrated the urgent need for the country to regain its forest cover. With its forest resources practically depleted, a high level of vulnerability to climate change, social improvements needed, and the desire for economic growth, the country has a significant number of challenges to contend with. It has become clear that proper management of listed forests will be an essential factor in responding to these challenges. The LULUCF emissions sector is a multi-lateral issue: forest protection efforts are linked to the agriculture, energy and mining sectors. As such, it mobilizes significant amounts of resources and a range of stakeholders. REDD+, national and international NGOs, food manufacturing firms, producer organisations in agricultural sectors and local communities are all knuckling down to tackle the monumental task of recovering and preserving Ivory Coast's forest cover.

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# The indispensable role of biomass and soils in France, concrete actions still being discussed

In 2016, in metropolitan France, the land sector was used to offset 9% of the emissions of other sectors. The goal is to reach 100% or more by 2050, both by reducing emissions and increasing this carbon sink. Research organisations play a key role for this sector where scientific uncertainties are still very significant and where debates on the effects of the actions carried out are not yet settled. The mobilisation in recent years of private actors (timber industry, forest owners, farmers) has resulted in the growing establishment of the private sector, the development of the wood energy and timber markets, national voluntary carbon offset projects and agricultural practices that promote the storage of carbon in soils, through the 4 per 1000 initiative.

Head editor • COLAS ROBERT • Agriculture & Forestry Engineer, Citepa

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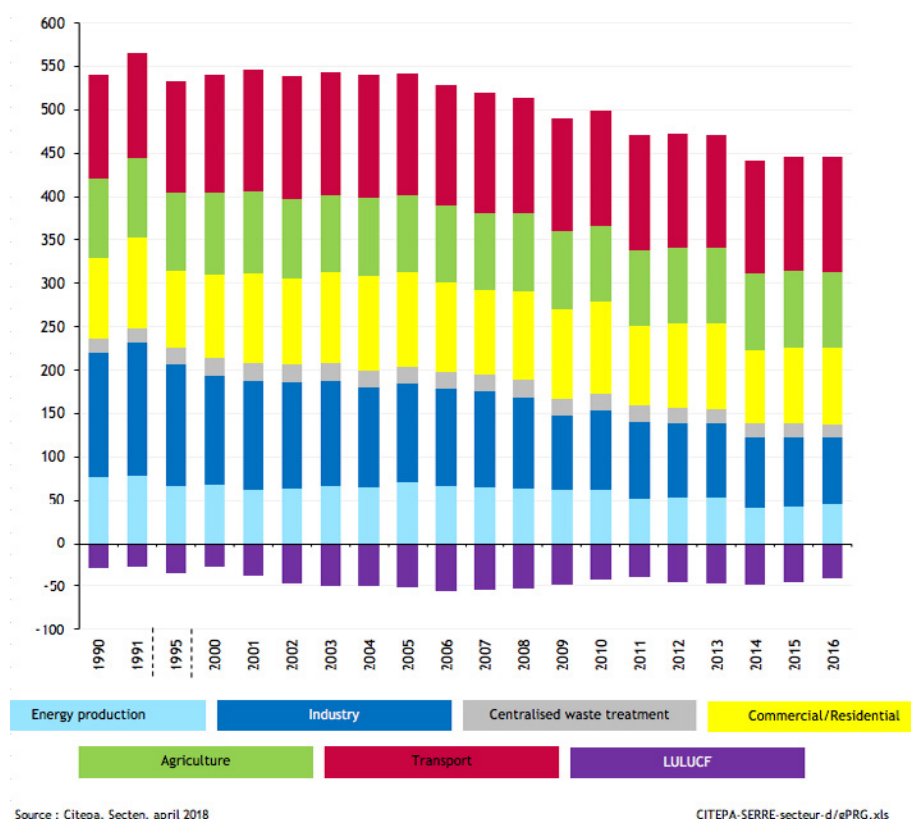
The agri-food sector is developing labels and actions for storing carbon in the soil

The actions of elected representatives, developers and citizens make it possible to start limiting the artificialisation of land



## 1 • CURRENT SITUATION AND UNCERTAINTIES ABOUT THE ANALYSIS

• **THE CURRENT ROLE OF THE LAND SECTOR IN FRANCE'S CARBON FOOTPRINT** • In 2016, the balance sheet of the Land Use, Land Use Change and Forestry sector (LULUCF, or more simply land sector) in France was a net sink of -41 MtCO<sub>2</sub>e. This means that the absorptions (mainly through the growth of trees in the forest) of this sector exceed its emissions (deforestation, wood extraction, artificialisation of soil, etc.). This carbon sink increased between 1990 and 2000, from around -30 MtCO<sub>2</sub>e to -50 MtCO<sub>2</sub>e, to -45 MtCO<sub>2</sub>e in the 2010s (Citepa, 2018). LULUCF is currently able to offset about 9% of emissions from other sectors.



• **WHAT ARE WE TALKING ABOUT?** • The LULUCF sector accounts for greenhouse gas flows directly or indirectly related to human activities; under a national approach (emissions occurring abroad but attributable to French consumption of wood, biofuel or food raw materials are excluded). It includes:

- the carbon footprint of the managed forest (absorptions related to tree growth and emissions related to mortality and timber harvesting) and timber products,
- the carbon footprint of farmland (variation of their organic carbon stock due to practices)
- the soil carbon footprint after change of use (cultivation of permanent grassland, deforestation, afforestation, artificialisation, etc.).

It is important to note that at no time are stocks (total carbon in a reservoir) counted as such. Only flows are counted. Thus, the mere presence of a forest, however extensive, does not guarantee a carbon sink.

• **WHAT IS THE CURRENT SINK DUE TO? WHAT LEVERS CAN BE USED TO MAXIMISE IT?** • The current sink is mainly due to the growth of biomass in the forest, associated with a low rate of wood extraction. The extension of the forest on the surface plays only a secondary role. The carbon footprint has generally been stable over the last few years, with a slight downward trend in the

sink linked to stagnant organic production and higher extractions. Thus, the wood extraction rate is an important adjustment variable for the carbon sink.

The balance of farmland has less impact in the inventory. The carbon flows associated with these farmed soils remain highly uncertain, both because of the difficulty in tracking relevant land-use changes (Robert, 2016) and the difficulty of matching soil carbon stock changes with management factors (current CSOPRA research programme).

Finally, land use changes as a source of CO<sub>2</sub> emissions are less significant than the carbon footprint of forests. The artificialisation of land alone (mainly by urban sprawl) has accounted for annual gross emissions of about 10 MtCO<sub>2</sub>e in recent years.

• **RECENT RESEARCH** • To facilitate the climate actions of non-state actors in the LULUCF sector, a crucial problem is still to be solved: the major uncertainty regarding the estimate of the LULUCF sector's carbon footprint and the real impact of the different levers of action.

Various research projects have led to progress, especially in 2017, on these issues and the scientific community is mobilising to reduce these uncertainties. Accordingly, very recent works have led to:

- improved monitoring of carbon stocks and flows (harvests, destinations and lifecycle of wood products, monitoring of land-use change surfaces, forest and non-forest biomass, etc.). For example, for the monitoring of land use, recent studies by the IGN (OCSGe project whose interim results were produced in 2016) and the CESBIO laboratory (OSO project financed by the Théia Unit, with results available since 2016) have led to better quantification of the LULUCF sector and monitoring of afforestation actions in particular.

- evaluation of the impact of the various actions carried out by forest and agricultural stakeholders, with expertise from various research organisations (INRA, IGN, Ademe, CNRS, Irstea, IPSL, ONF, Citepa, FCBA, etc.) (Colin, 2014; Colin & Thivolle-Cazat, 2016; Roux et Dhôte, 2017; Valade et al. 2017).
- better estimates of certain flows, currently not calculated in the national inventory, such as forest soils (without conversion of use), whose sink may represent 7 to 15 MtCO<sub>2</sub>e/ year (Jonard, 2017, Roux and Dhôte, 2017); dead wood with a sink of 10 MtCO<sub>2</sub>e/ year (Roux et Dhôte, 2017); or the Guianese forest (excluding deforestation and harvesting).

• **IN 2017 AND 2018, STRATEGIC DISCUSSIONS BROUGHT TOGETHER STATE AND NON-STATE ACTORS** • In 2017 and 2018, forest, agricultural and NGO stakeholders participated in producing the review of the National Low Carbon Strategy (SNBC) and in discussions on the implementation of the European LULUCF Regulation (2018/841). There is no political and scientific consensus on the best actions to be taken by non-state actors to address the climate issue in the short and long term, whether it involves conserving timber in the forest or increasing harvesting. Numerous stakeholder discussions in recent years have not resolved these strategic debates. However, a number of messages have emerged:

- the need for maximum development of negative emissions
- the need to structure the French timber industry and provide incentives for private owners to remedy the inertia of the sector,
- the desire to prioritise the sustainable storage of wood in timber products rather than wood fuel,
- caution regarding the non-permanence of carbon storage in agricultural soils,
- the difficulty of acting through multiple stakeholders (foresters, landowners, sawmills, builders, developers, elected officials, farmers, etc.).





## 2 • ACTIONS IN THE FOREST-TIMBER SECTOR

### • RECENT DEBATES BETWEEN NON-STATE ACTORS ON THE BEST ACTIONS TO BE TAKEN IN FORESTRY •

Forest biomass is currently the main building block of carbon sinks of the French LULUCF sector. According to the latest IGN figures (2017) the Metropolitan French forest is private (75%), fragmented (53% of the private plots occupy less than 25 ha (FCBA, 2016)); and characterised by hardwoods (67%). Its surface area, 16.9 million ha in 2017, is increasing (+100,000 ha/year), as is its volume (+27 million m<sup>3</sup>/year) (Hervé et al., 2016). As wood extractions (45 Mm<sup>3</sup>/year) are lower than production (92 Mm<sup>3</sup>/year), it continues to act as a carbon store (IGN, 2017).

Thus, forest biomass and the decision to optimise its role as a carbon sink (storage, sequestration, carbon replacement) are the focus of the bulk of scientific and political debate (Grassi, et al., 2017; Kauppi & Mäntyranta, 2014). Sequestration consists of prioritising increases in forest carbon stocks (biomass, deadwood and soils) with extensification of harvesting. For proponents of this approach, increasing timber harvesting would create a «carbon debt» that will only be offset by the regrowth of trees in the long term - while the urgent task is to limit emissions in the short term, by 2050. This approach is particularly critical of the use of wood for fuel, resulting from short rotations. During the past two years, NGOs and scientists have promoted this strategy (Beddington et al., 2018; Fern 2016). During these debates, economic stakeholders have rather emphasised substitution, involving prioritising the use of the forest for wood extraction which stores carbon temporarily and replaces other materials of other non-renewable energies with higher emissions. Furthermore, sustainable forest management ensures its ability to continue storing carbon and reduces the risk of mortality (Seidl et al., 2014; Galik & Jackson, 2009; Rautiainen et al., 2010; Nabuurs et al. 2015).

Even if it is possible to advocate an approach using a wide range of levers, in recent years there has been conflict between some economic stakeholders in the timber industry and scientific organisations and NGOs.

• **MOBILISATION AND ORGANISATION OF THE SECTOR** • Recent reports (Houpert & Botrel, 2015; Colin & Thivolle-Cazat, 2016; Alexandre, 2017; Ballu, 2017) take up the well-known finding of the French «paradox» of the under-exploitation of French forestry resources - which are actually expanding. Faced with this challenge, forest stakeholders are mobilising little by little.

At the beginning of 2018, the CNPF launched a platform ([laforetbouge.fr](http://laforetbouge.fr)) providing forest owners with free tools for training and documentation for better management and use of their plots (forestry work, management, sale of wood, etc.). This site therefore provides a response to certain brakes that have resulted in the under-exploitation of the French forests, to promote the long-term role of carbon sinks and to boost the timber industry.

Between 2014 and 2015, the number of private owners joining a cooperative increased by 4.5%, which made it possible to strengthen the supply of timber and contributed to national harvesting of 6.9 Mm<sup>3</sup> (+4.5% in one year).

In 2014, the forest-timber sector (FBF-FBIE) published its «pact for the future 2020 - the commitments of the sector». The commitments adopted include 110,000 ha/ year in renewal, improvement and adaptation of the forest; an increase of 14.5 Mm<sup>3</sup> by 2020 in sustainable timber mobilisation; maintenance of the carbon sink; a recalibration of the trade balance of timber; a rise of 3Mtep of wood energy, etc.

• **THE FORESTRY SECTOR IS MOBILISING IN CARBON RECOVERY** • The French forest cannot currently be used directly as a carbon pump by foresters. In the absence of a binding market, a market for voluntary projects has developed in recent years in order to promote this ecosystem service provided free of charge by the forest and the stakeholders who maintain it. On the one hand, more and more companies want to invest in forest carbon sequestration work.

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### **La Poste Group and GIP Massif Central invest in forest carbon credits**

In 2015, a programme was launched by the National Centre for Forest Ownership (CNPF) in partnership with the Massif Central Public Interest Group to define forestry carbon offset projects to provide carbon credits: afforestation in non-forested areas, reforestation (replacement of diseased, burned, poorly adapted areas, etc.) and improvement of forest management. La Poste Group has invested nearly EUR 300,000 in this programme. The private owners of the Forêt Agir Limousin association have thus been able to finance actions to reinforce carbon sequestration in the forest (monitoring of chestnut coppice, increases in hardwoods, (re) afforestation of conifers), whose effectiveness has been verified by the CRPF.

TEXT BOX 1

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This approach to ensuring the monetisation of a tonne of carbon avoided or sequestered in a French forest project is still to be certified. With this in mind, since 2016 I4CE has been developing a labelling scheme for voluntary carbon projects. Potential in France has been estimated at between 2 and 2.5 MtCO<sub>2</sub>e/ year (Tronquet, Grimault & Foucherot, 2017), i.e. nearly 0.5% of non-LU-LUCF metropolitan emissions. The implementation of a low-carbon label, resulting from this I4CE work, supported by the Ministry of Ecology, aims to promote the emergence of these projects by ensuring the reliability of avoided emissions calculations.

#### **• LOCAL AUTHORITIES NOW INCLUDE THE LULUCF SECTOR IN THEIR CLIMATE STRATEGIES •**

Moreover, communities required to produce a climate-air-territorial energy plan (PCAET) are doing the same. The CNPF recently developed a calculation tool to assist councils for better integration of forests in their GHG emissions assessments. This tool is used to compare several ways in which silvicultural programmes can be used to improve the local carbon footprint. Accordingly, communities, businesses and consumer groups now have the tools to encourage them to maximise their carbon sinks.

**• AFFORESTATION AND REFORESTATION ARE BEING DEVELOPED •** Actions aimed at avoiding growth in logging or even reducing forestry management in some forest areas, serve several purposes: carbon storage in standing trees and dead wood, forest litter and soil; improved productivity and better economic use of species; the protection of biodiversity, in particular through the preservation of old-growth patches and by limiting human presence; ecological tourism.

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### **Reforest'action**

Reforest'action, a company that was founded in 2010, is one of the key players in reforestation from private funds in France. It was created in response to the finding that forest plantations were decreasing in France, with a consequent reduction in forest renewal, making it more vulnerable to crises. It restores degraded forests (burned, flooded, diseased, destroyed by storms, etc.), reforests areas with limited forest coverage and supports sustainable harvesting and recovery methods for harvested timber. More than a million trees have been replanted in France since 2014.

TEXT BOX 2

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• **THE RISE OF WOODEN CONSTRUCTIONS** • The timber sector is not very competitive, the business is fragmented with limited coordination between upstream production (in a predominantly hardwood forest) and downstream processing (with strong demand for softwoods). In recent years, timber for construction, driven by the success of the CLT (Cross Laminated Timber) manufacturing technique, has led to the creation of new outlets and appreciation of wood-material. Regardless of the origin of the wood, even if it comes from foreign forests, the construction of long-lasting wooden furniture and buildings makes it possible to store carbon sustainably in France, as a substitute for materials with higher emissions. The recent rise in the use of structures built wholly or partly from wood is an indicator of change in the construction sector, technical solutions and demand.

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### ***The rise of wooden buildings in recent years***

Wood real estate projects, including high-rise buildings, have proliferated in France since 2016. Since 2016, the AdivBois (Association pour le développement des immeubles à vivre bois) technical commission has been seeking to facilitate these programmes and to remove technical, economic and regulatory obstacles, for example by promoting technical support for the construction of demonstrators of the first wave of wooden buildings. These projects are also supported by Future Investment Programmes (PIA of the future agriculture and forestry law 2014).

In particular, «the market for buildings with timber structures and concrete infrastructure is booming» (O. Messéant, 2017). In 2017, a call for projects selected the project for two timber-framed towers in Bordeaux, including the Hyperion tower which, at 57 metres, will be the highest tower of this type in France. Another 50 m wooden tower, WoodUp, was also selected in 2017 in Paris. In Strasbourg, the highest tower in France with a 100% timber frame, 38 m high, was delivered in 2018.

TEXT BOX 3

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• **WOOD FUEL AND BIOMASS HEATING PLANTS: MANUFACTURERS AND COMMUNITIES ARE INVESTING** • The benefits of biomass energy for the climate is subject to debate. These actions are based on the idea that wood is a carbon neutral and renewable energy source. Nevertheless, this widespread view does not match the actual balance of carbon flows (Leturcq, 2011; 2013).

Indeed, the supposed carbon neutrality of wood fuel is based on the idea of systematic offsetting, of a cycle at equilibrium between emissions and sequestration. But in reality, this balance is not always achieved and, when it is, it occurs over a long time span. Excluding the emissions of wood fuel on the pretext that the carbon had already been captured in the past or will be recaptured in the future introduces bias in the estimate of the LULUCF carbon footprint: from the moment when the sequestration flows are calculated each year, all emission flows for the year must also be accounted for.

The development of biomass combustion plants in recent years is largely based on two types of incentives: firstly, under the European Emissions Trading System, biomass consumption leads to eligibility for free quotas but the associated emissions are not counted; secondly, the Heat Fund, managed by ADEME, supported the production of 2 Mtoe with € 1.6 billion between 2009 and 2016. Many biomass plants have been built in recent years, making it possible to replace other energies. Ademe has published a document with 54 typical examples of companies that have invested in biomass energy (wood boilers, wood chips, end-of-life wood products, etc.) (Ademe, 2018).

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### ***Some examples of recent investments in biomass***

- Bordeaux (2015): creation of a wood boiler at the Charles Perrens hospital, with a total capacity of 9.5 MW, consuming 18,000 t of wood per year and avoiding 10,700 t/ CO<sub>2</sub>/ year.
- Nantes (2017): extension of a 57 km heat system and construction of two wood boilers (Malakoff), with 84% local renewable energy supply (waste recovery or biomass, consuming 45,000 t of wood per year and avoiding 45,000 t/ CO<sub>2</sub>/ year.

- Suez (2018) invests in the CogeBio start-up, which offers innovative solutions for the production of heat and electric energy by gasification of biomass and waste. «Biomass consumption for industrial heat production has doubled in the last five years in Europe and is expected to reach 20 million tonnes in 2021» (Suez, 2018).
- Lyon (2018): creation of the largest public biomass boiler in France. The Surville plant, managed by Dalkia, will prevent 44,000 t/ CO<sub>2</sub>/ year.

TEXT BOX 4

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## **3 • ACTIONS TO MAINTAIN AND INCREASE CARBON IN SOIL**

### **• THE LAUNCH OF THE 4 PER 1000 INITIATIVE BRINGS TOGETHER SCIENTISTS, DECISION-MAKERS AND LOCAL STAKEHOLDERS FOR THE STORAGE OF CARBON IN SOIL**

• While forest biomass has been the major focus of strategic considerations on organic carbon storage, the role of agricultural soils in France and in the world was underlined by the launching of the «4 per 1000» programme, during COP21.

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#### ***The 4 per 1000 project***

The 4 per 1000 initiative aims to increase organic carbon storage in soils. It has resulted in the establishment of a scientific committee to enable research to identify agricultural practices for carbon storage and disseminate them to farmers, agricultural advisers and chambers of agriculture. In 2017, INRA therefore began a study on the feasibility of the 4 per 1000 target in agricultural soils in France.

TEXT BOX 5

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As yet, there is no consensus on the long-term effects of storing practices and on their wider deployment, although recent research has made progress in this area (Arrouays, et al. 2002; Pellerin, et al. 2013). Practices are, however, being developed:

- the reduction of ploughing, or even the implementation of cultivation techniques without ploughing.
- increased organic contributions to the soil (crop waste, etc.)
- intermediate crops, intercrops and grass strips
- agroforestry and the planting (or preservation) of hedgerows

The difficulty of setting up a carbon storage policy on agricultural land is due to several obstacles: scientific uncertainties related to understanding and monitoring long-term dynamics and spatio-temporal variability; the interconnection of factors, the immensity of the spaces involved; the number of operators; socio-economic barriers to the adoption of new practices; the complexity of existing environmental standards and arrangements affecting agriculture; consideration of other environmental issues (air pollution, water, landscape, soil quality, biodiversity, erosion, etc.).

### **• THE AGRI-FOOD SECTOR IS DEVELOPING LABELS AND ACTIONS FOR STORING CARBON IN THE SOIL**

• Some farmers indirectly render an eco-systemic service by storing carbon in the soil, but their management is constrained by many economic, agronomic, environmental and technical



factors. Beyond European aid (CAP payments subject to virtuous ecological practices in terms of soil carbon, such as the maintenance of permanent grasslands, areas of ecological interest and agro-ecological infrastructures) and national support (reward for the eco-systemic services mentioned in recent discussions around the Climate Plan (July 2017), the National Food Conference (2017), the SNBC (2018) and the Biodiversity Plan (2018), the private sector has also put some actions in place.

Thus, farmers and cooperatives have created labels enabling consumers to opt for agri-food products from soil conservation agriculture, for example the «Ferme Carbone Vert» label (first two farms labelled in Seine-Maritime in 2017); or the «Pour une agriculture du vivant» label, created in 2018 to distinguish products from agroforestry.

Finally, localities have been increasingly concerned to consider carbon in agricultural soils since the integration of the land sector into the PCAETs in 2016.

**• THE ACTIONS OF ELECTED REPRESENTATIVES, DEVELOPERS AND CITIZENS MAKE IT POSSIBLE TO START LIMITING THE ARTIFICIALISATION OF LAND •** Fighting against artificialisation (urban sprawl, construction of infrastructures) makes it possible to avoid losing (most of the time forever) the carbon stock already present in the soil. The objective of «zero net artificialisation by 2050» has been broached at European level (COM (2011) 571) and at national level (C. Duflot, 2013; N. Hulot, 2018). The construction of suburban housing and estates is the main cause of consumption of agricultural land. Developers, local authorities and citizens all have a role to play in limiting the obstacles to densification in urban areas and limiting the economic appeal of construction on agricultural land.

In 2013, the BIMBY project (Build in my BackYard) was completed bringing together research establishments, technical departments and local authorities. It led to the definition of a new habitat production sector, where the «traditional» sectors are unable to act: within the existing suburban fabrics. Identifying this potential for recycling urban space has made it possible to group together different parallel projects and create a network (Bimby+), facilitating exchanges between professionals in this new development sector.

On the side of promoters and owners, initiatives have emerged for the densification of suburban areas. Some metropolitan areas are seeking to limit urban sprawl, such as Rennes or Aix-Marseille-Provence (goal in 2017 of «zero consumption of green space in 2040»).

In terms of citizens and NGOs, the last few years have been marked by the emergence of strong, high-profile opposition movements against projects that consume large amounts of agricultural and forestry land. For example, the opposition to the Notre-Dame-des-Landes airport project, in the holiday village of Roybon Isère and the major motorway bypass west of Strasbourg, among others.

## CONCLUSION

To conclude, we can say that in recent years, the climate role of biomass and soils is increasingly recognised by non-state actors. Even if many structural obstacles remain, France's strengths (its agricultural and forestry heritage) are the target of an increasing number of projects by forestry and agricultural stakeholders and research organisations. The years 2016 to 2018 marked the transition to the post-Paris Agreement era in which the overarching principle of carbon neutrality is beginning to be reflected in the actions of forest and agricultural stakeholders.

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