

- State and Trends of Deforestation in
- Côte d'Ivoire (2019-2020)



Report prepared for the UK Space Agency

July 2020

Executive Summary

- Between 2019 and 2020, Côte d'Ivoire lost 2%, more than 68,000 hectares, of its primary forest.
- In 2019, forests in Côte d'Ivoire accounted for less than 9% of its territory, compared to 15% in 1986.
- More than 75% of recorded deforestation took place in rural forests, putting at risk the remaining reservoirs of primary forest in the country:
 - ◇ 50% of the deforestation in rural areas, 24,000 hectares, took place in the four centre-east regions of Iffou, Gontougo, N'zi and Bélier, where primary forest is already extremely fragmented and at further risk of being cleared. These regions are the last reservoir of rural forests in the country.
 - ◇ In the Western part of the country, the region of Cavally has lost over 7% of its cover, 1,100 hectares, over one year only, with more than half of the losses of primary forest in the region occurring in the department of Bloléquin. Cavally lost approximately 40% of its rural forest, 34,000 hectares, over the past three years.
 - ◇ Due to rampant forest loss in the West, caused by cocoa farming, the size of the remaining forest in the department of Bloléquin has been halved since 2016.
- More than 21% of the observed deforestation took place in Forêts Classées:
 - ◇ In 2019, Forêts Classées lost 6 to 7 times higher percentage of forested area than National Parks and Reserves. They contain similar total areas of remaining forest.
 - ◇ Forêts Classées registered 581,000 hectares of primary forest in 2019. Over three quarters of Forêts Classées have lost more than 80% of their initial cover.
 - ◇ The two most affected areas, Forêt Classée de la Téné and de la Sangoué, have lost respectively 10%, 2,159 hectares, and 5%, 1,000 hectares, of their forest between 2019 and 2020. Losses could be due to ongoing teak logging as well as cocoa encroachment. Their level of fragmentation and forest loss is representative of other Forêts Classées.
 - ◇ While Forêt Classée de Cavally's deforestation rates have decreased and stabilised in the past two years, Forêt Classée de Goin Debé has lost more than 40% of its surface, almost 10,000 hectares, between 2016 and 2019. Most losses were due to cocoa farming. Forêt Classée de Goin Debé has lost 90% of the forest cover it was initially assigned.
- Only 3% of the recorded deforestation took place in National Parks and Reserves:
 - ◇ National Parks and Reserves registered 665,000 hectares of primary forest in 2019.
 - ◇ The forests within Marahoué and Mont Peko National Parks are close to disappearing. Between 2019 and 2020, Mont Peko National Park has lost 11% of its remaining forest left, 3,100 hectares. As of 2019, forest in Mont Peko National Park was almost ten times less than its 30,000 designated hectares. The Marahoué National Park contains an area of 103,000 hectares but now only shows 300 hectares of forest.

Table 1 Rural forests and Forêts Classées have registered dramatic deforestation rates between 2019 and 2020

| | Designated surface (ha) | 2019 forest surface (ha) | 2019-2020 deforestation (ha) | Deforestation rate (%) |
|-----------------------------|-------------------------|--------------------------|------------------------------|------------------------|
| Rural forests | 25,881,009 | 1,812,159 | 51,552 | 2.8 |
| Forêts Classées | 4,006,587 | 581,280 | 14,521 | 2.5 |
| National Parks and Reserves | 2,163,951 | 665,524 | 2,203 | 0.3 |
| Total | 32,051,547 | 3,058,963 | 68,275 | 2.2 |

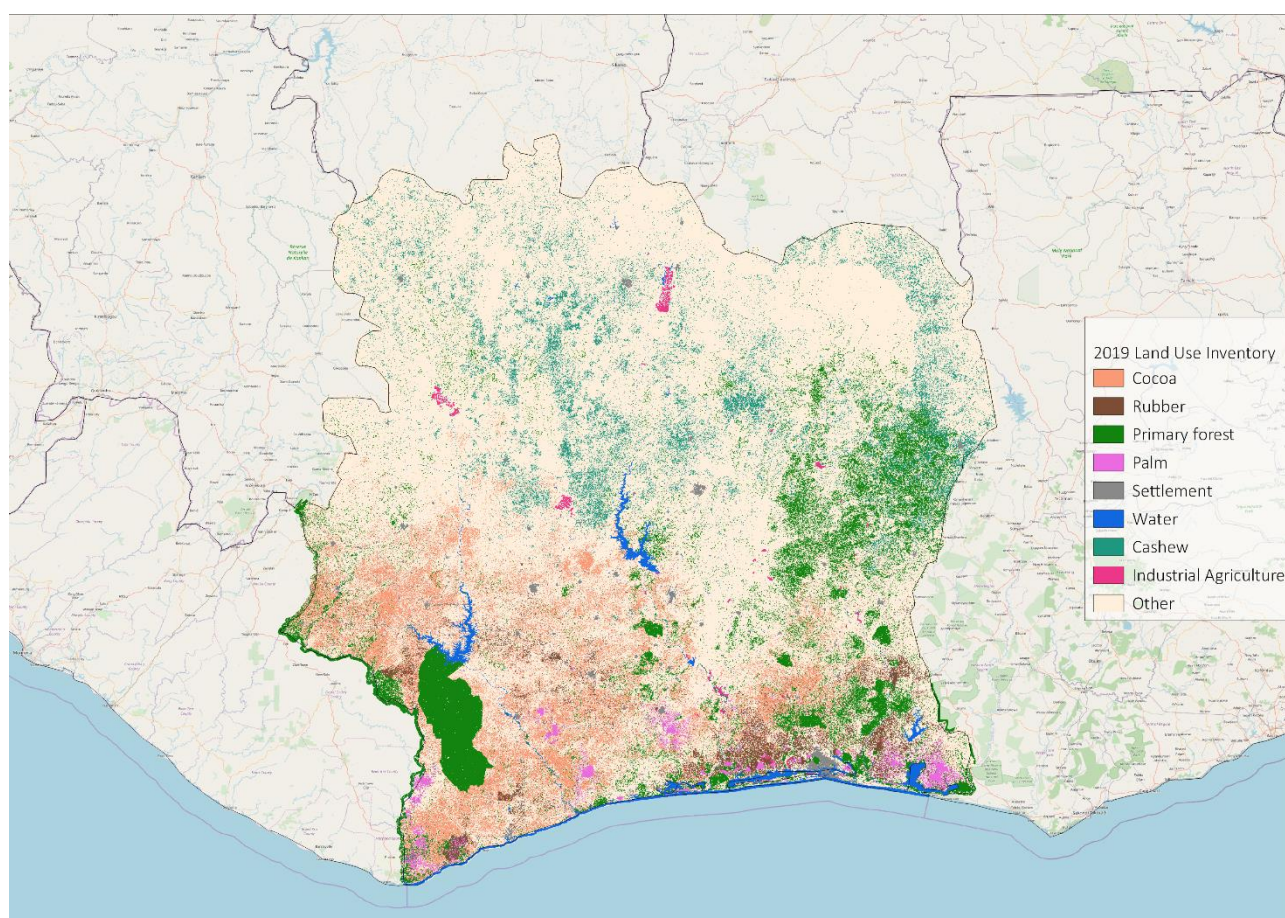
Source: Vivid Economics and RSAC, IMAGES (2020), <https://www.vivideconomics.com/images>

1 Introduction

1.1 Introduction

This report sets out the state and trends of deforestation in Côte d'Ivoire between 2019 and 2020, across administrative regions and protected areas. Forest loss refers to the destruction of primary forest, which was detected through fortnightly analysis of satellite observation data. The observations were made between June 2019 and May 2020 and cover the 2019/20 dry season. The dry season typically contains the peak in the annual cycle of deforestation.

Figure 1 The 2019 land use inventory recorded 3,05 million hectares of primary forest, with Tai National Park being the only remaining large scale intact area in the country



Source: Vivid Economics and RSAC, IMAGES (2020), <https://www.vivideconomics.com/images>

In 2019, primary forest accounted for only 9%, 3,05 million hectares, of Côte d'Ivoire. In comparison, it accounted for 15% of Côte d'Ivoire's territory in 1986.¹ IMAGES 2019 land use inventory recorded 3,05 million hectares of primary forest, most of which is highly fragmented. Box 1 sets out IMAGES' definition of primary forest. Comparable figures for commodity crops are 2,8 million hectares of cocoa and 1,6 million hectares of cashew.

¹ Food and Agriculture Organisation and SEP-REDD+. (2015). Données forestières de base pour la REDD+ en Côte d'Ivoire. <http://www.fao.org/3/a-i8047f.pdf>

Box 1 Definition of primary forest in IMAGES

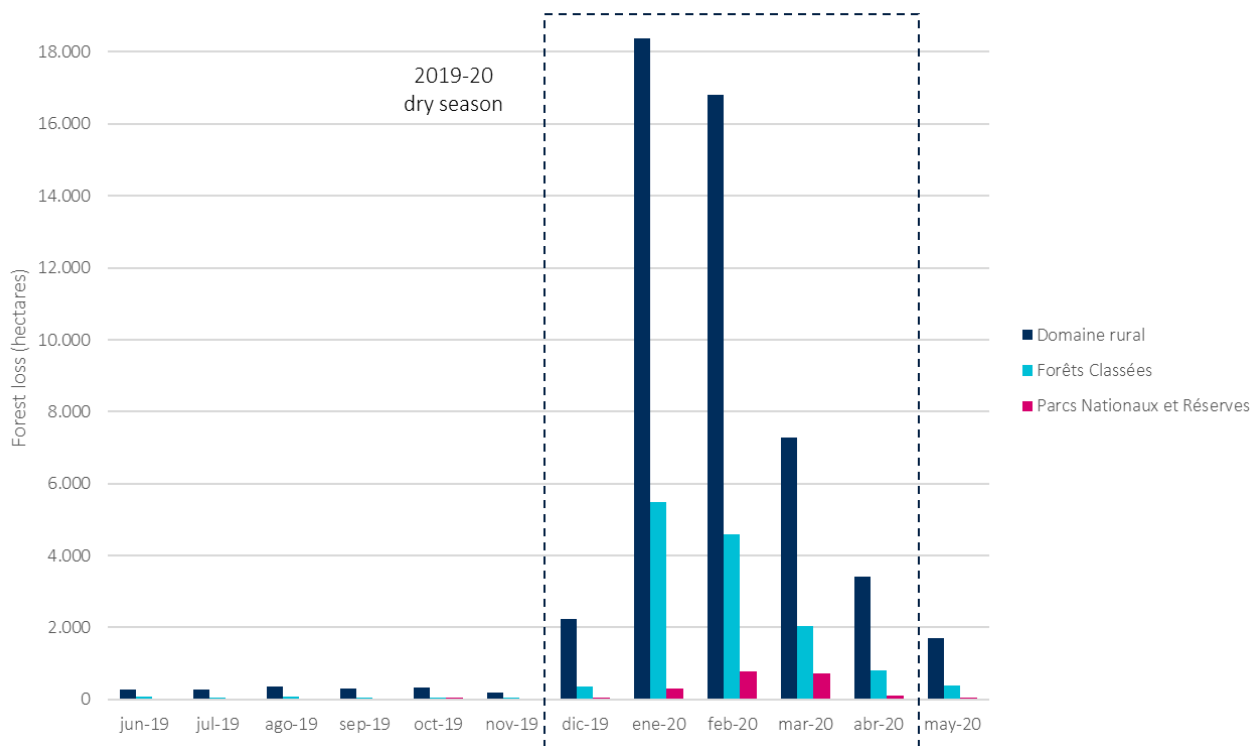
- Primary forest is defined as land with tree canopy cover superior to 70%, in which trees should reach a minimum height of 15 meters.
- The definition includes :
 - Closed forest formations where trees of various storey and undergrowth cover a high proportion of the ground, with no trace of human activity.
 - Gallery forests and any type of closed dense forest along rivers or wetlands in savannas.

Forests in Côte d'Ivoire are classified as rural forests, Forêts Classées and National Parks and Reserves. Rural forests account for 59% of the remaining primary forest. Rural forests are under direct management of the Ministry of Water and Forests (MINEF). In practice, they belong to the neighbouring communities. Forêts Classées and National Parks and Reserves represent respectively 19 and 22% of the country's remaining forests. Forêts Classées can be commercially exploited through a partnership agreement with the Forest Development Corporation (SODEFOR). National Parks and Reserves, under the Ivorian Parks and Reserves Office (OIPR), are not available for commercial exploitation. The Tai National Park is the only remaining large scale intact forest in the country. It accounts for 16%, almost 510,000 hectares, of the country's remaining forest.

Between June 2019 and May 2020, the country has lost more than 68,000 hectares of its primary forest. As seen in Figures 3 and 4, the driest months of the year, from late December to April, are the peak season for loss of primary forest. Approximately 68% of the annual forest loss took place in January and February 2020.

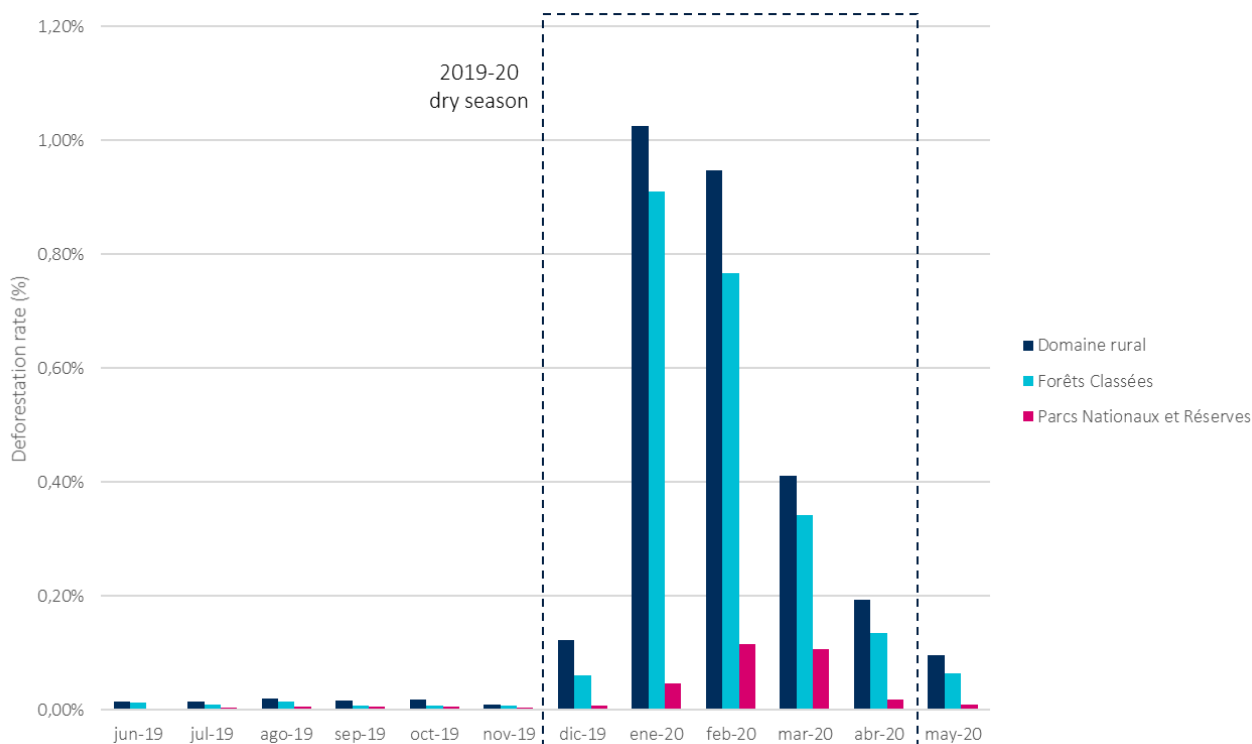
Figure 3 shows that 75% of deforestation has taken place in rural forests. Deforestation in protected areas, 'Forêt Classée' and 'Parc National', accounted for, respectively, 21% and 3% of total forest loss in the country. Over the past year approximately 16,259 hectares of legally protected forest have disappeared.

Figure 2 Approximately 68% of the annual forest loss took place in January and February 2020



Source: Vivid Economics and RSAC, IMAGES (2020), <https://www.vivideconomics.com/images>

Figure 3. In the single month of January 2020, rural forests lost more than 1% of their surface



Source: Vivid Economics and RSAC, IMAGES (2020), <https://www.vivideconomics.com/images>

This report is structured as follows:

- Section 2 describes deforestation state and trends in rural areas
- Section 3 details deforestation state and trends in Forêts Classées
- Section 4 details deforestation state and trends in National Parks and Reserves
- Section 5 sets out recommendations to limit further deforestation

2 Rural forests

This section discusses state and trends of deforestation in rural forests.

Between 2019 and 2020, over 51,571 hectares of primary forest have been cleared in rural areas, accounting for 75% of the deforestation in Côte d'Ivoire. In 2019 rural forests represented 60%, or 1,8 million hectares, of the country's last standing forests. Dramatic deforestation rates in rural areas confirm the worrying trends highlighted in last year's report.²

2.1 Centre-East

Almost 50% of the deforestation in rural areas, 24,000 hectares, took place in the four centre-east regions of Iffou, Gontougo, N'zi and Bélier. While most of the public attention is usually placed on cocoa-led deforestation the South West of Côte d'Ivoire, the centre-east part of the country, which is home to more than 40% of the remaining rural forest in Côte d'Ivoire, is undergoing dramatic forest losses.

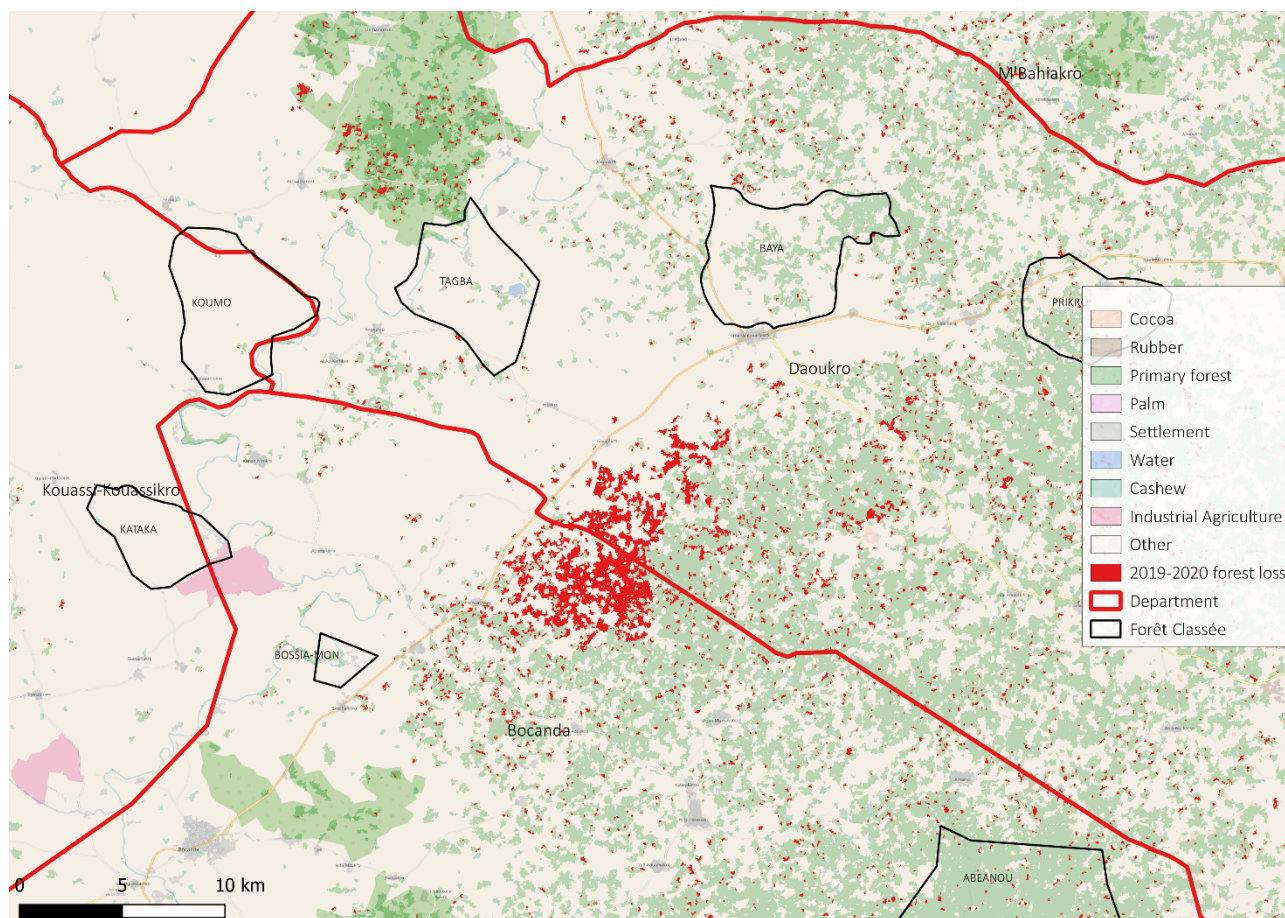
Within these regions, the departments of Bocanda, M'Bahiakro, Ouelle and Tiebissou were the most affected by forest loss. In particular, the department of Tiebissou has lost over 11% of its cover over the past year. Figure 4 illustrates the extent of deforestation in the Bocanda and Daoukro department, which spans several kilometres. It also highlights how fragmented the remaining forests have become.

Forest loss appears to take place in areas where forest is very fragmented or close to areas already deforested. Forest fragmentation presents a grave threat to biodiversity and climate regulation.³ It also puts the remaining forest patches at much higher risk of being deforested. This highlights the need for urgent action -community engagement, reforestation- in areas where forest is patchy to avoid further losses.

² Vivid Economics (2019), 2019 Update on Deforestation in South West Côte d'Ivoire, <https://www.vivideconomics.com/wp-content/uploads/2019/08/EN-2019-Update-on-Deforestation-in-South-West-C%C3%B4te-d%E2%80%99Ivoire-1.pdf>

³ Primack, R. B., & Morrison, R. A. (2013). Extinction, Causes of. Encyclopedia of Biodiversity: Second Edition, 3, 401–412. <https://doi.org/10.1016/B978-0-12-384719-5.00050-2>

Figure 4. The centre-east regions of Côte d'Ivoire are witnessing severe losses of their remaining fragmented rural forest, as seen in the area between the towns of Bocanda and Daoukro,



Source: Vivid Economics and RSAC, IMAGES (2020), <https://www.vivideconomics.com/images>

The Northern region of Hambol, which is close to the centre-eastern deforestation epicentre, is also undergoing severe loss of primary forest. Over 3,700 hectares, 6% of the forest detected in 2019, have been destroyed in the last year.

The drivers of deforestation in the centre-east of Côte d'Ivoire may be connected to cashew farming and bushfires. A comparison of IMAGES' 2019 land use inventory and BNETD's 2016 land use inventory shows places previously identified as forest have become cashew plantations. Bush fires in this geographical zone are an ongoing issue.

2.2 West

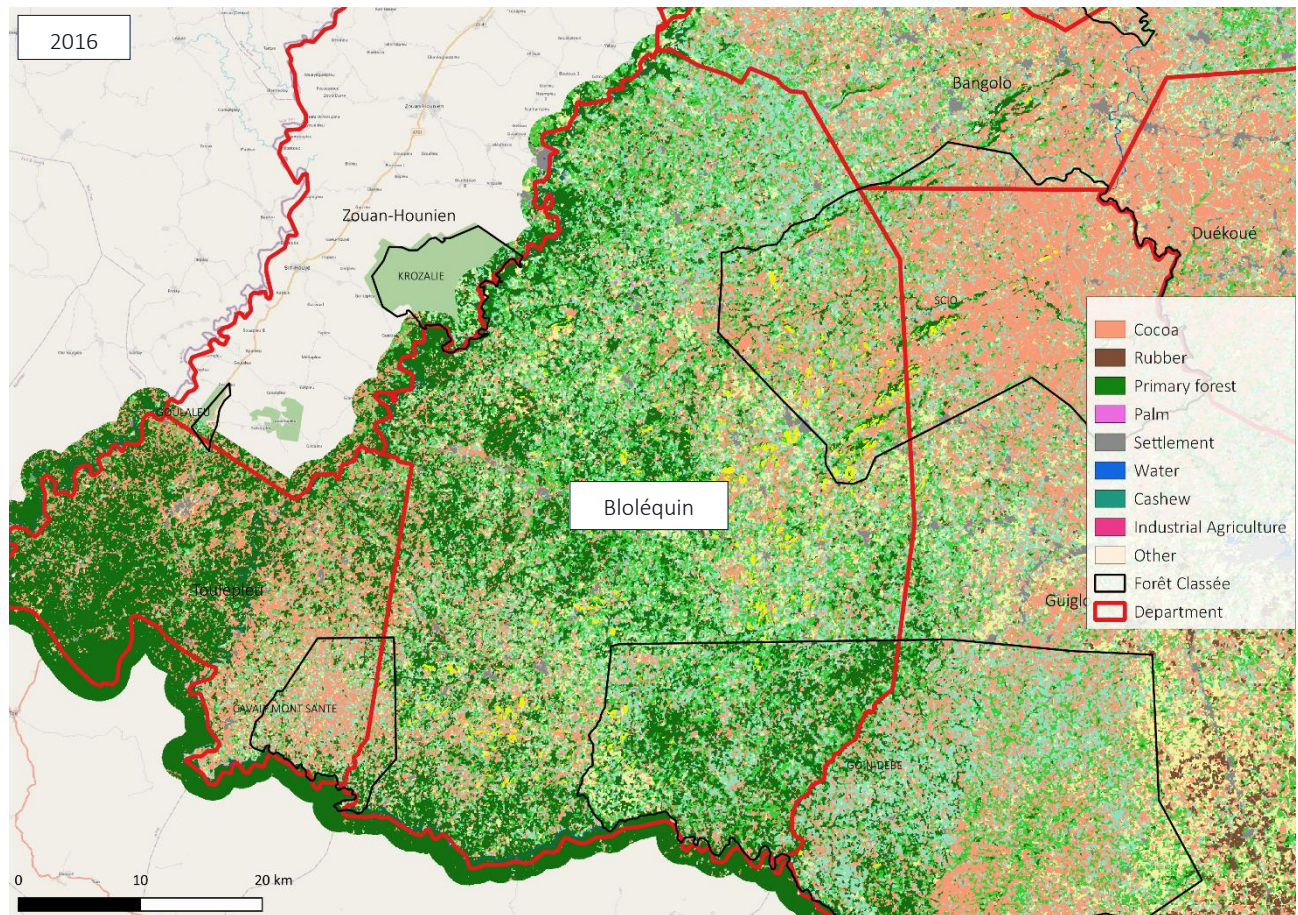
The Western region of Cavally has lost over 7% of its cover, 1,156 hectares, between 2019 and 2020.

IMAGES 2016 land use inventory recorded almost 87,000 hectares of primary forest. Three years later, IMAGES 2019 identified only 52,000 hectares. In other words, the region of Cavally lost approximately 40% of its rural forest, 34,000 hectares, over the past three years. More than half of the losses of primary forest in the region took place in the department of Bloléquin.

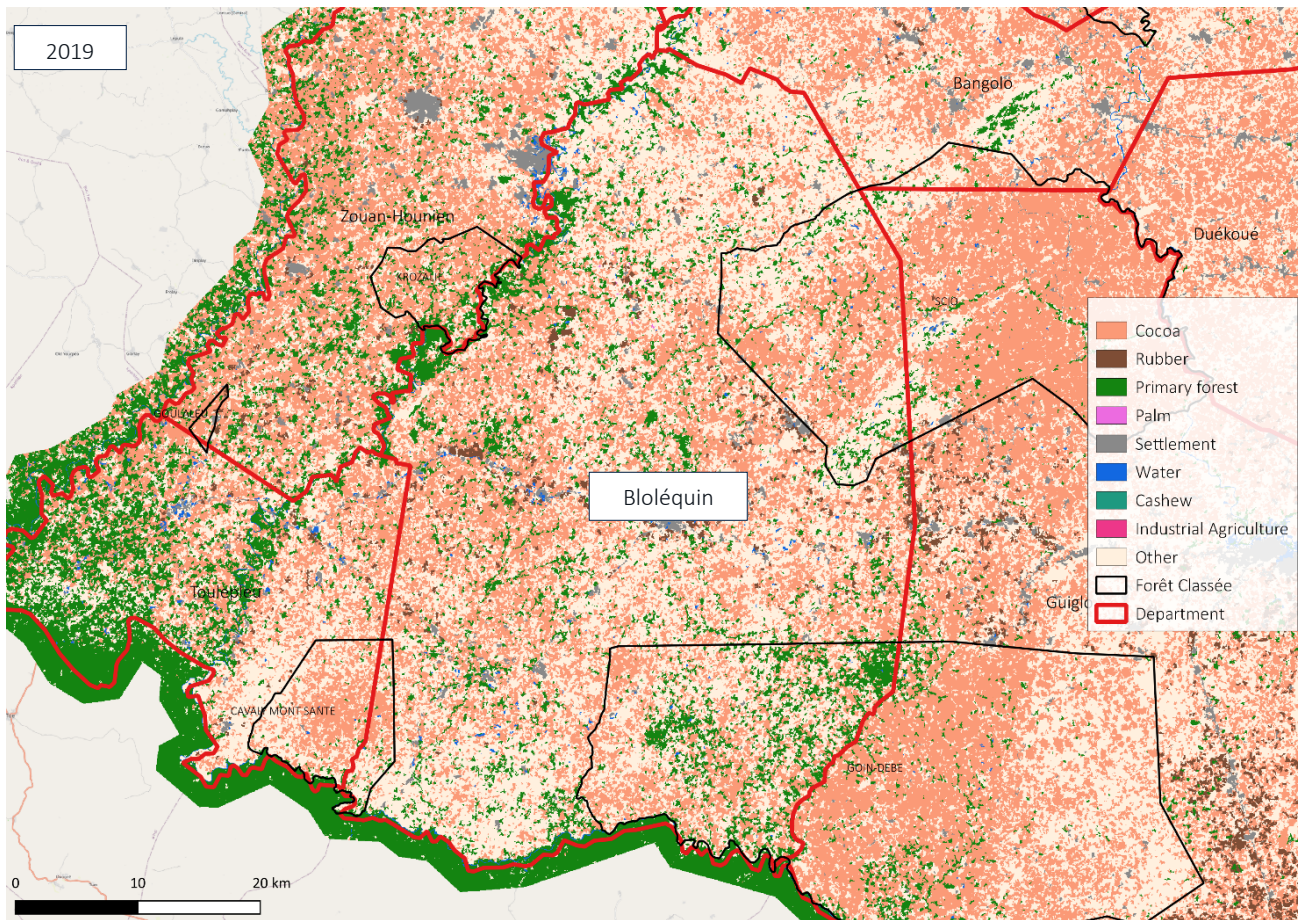
Bloléquin's remaining forest has been halved since 2016, with deforestation being largely attributed to cocoa farming. The 2016 IMAGES land use inventory identified more than 46,000 hectares of forest in the Bloléquin department. After years of dramatic deforestation rates in the area, flagged by IMAGES Early Warning System, IMAGES 2019 land use inventory identified only 24,000 hectares in Bloléquin. Figure 5

comparison of 2016 and 2019 IMAGES land use inventories shows that the 2016 remaining primary forest in the area has been cleared in favour of cocoa plantations. Ground truthing IMAGES' Early Warning System alerts in 2018 show that most of the recorded forest losses are mostly due to cocoa plantations.

Figure 5 A comparison of Bloléquin's land use inventory in 2016 and 2019 sheds light on the unprecedented loss of rural forest, replaced by cocoa plantations



State and Trends of Deforestation in Côte d'Ivoire (2019-2020)



Source: Vivid Economics and RSAC, IMAGES (2020), <https://www.vivideconomics.com/images>

3 Forêts Classées

This section discusses state and trends of deforestation in Forêts Classées.

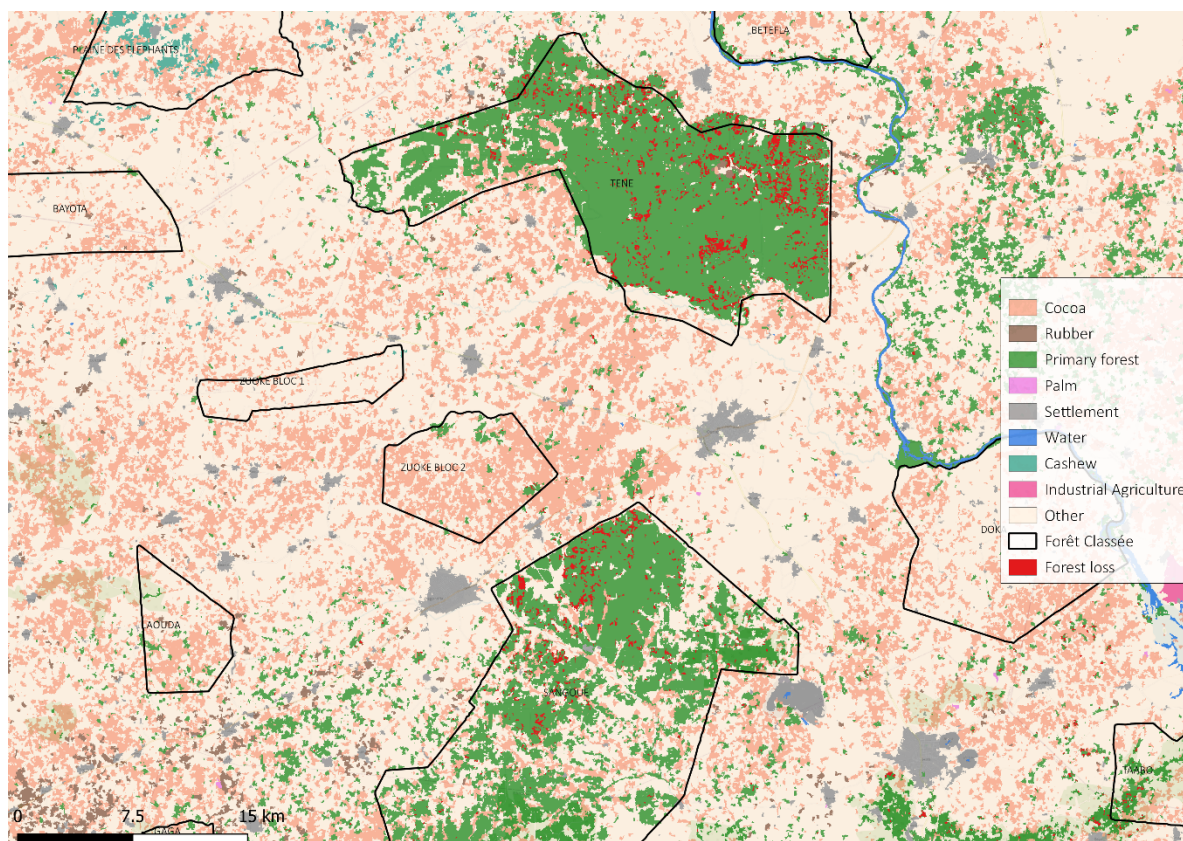
Deforestation in Forêts Classées accounted for 21%, more than 16,000 hectares, of forest loss in Côte d'Ivoire between 2019 and 2020. Similarly to National Parks and Reserves, Forêts Classées account for 20%, 628,000 hectares, of Côte d'Ivoire's remaining forests. Yet, the annual forest loss is 6 times bigger than the forest loss in National Parks and Reserves.

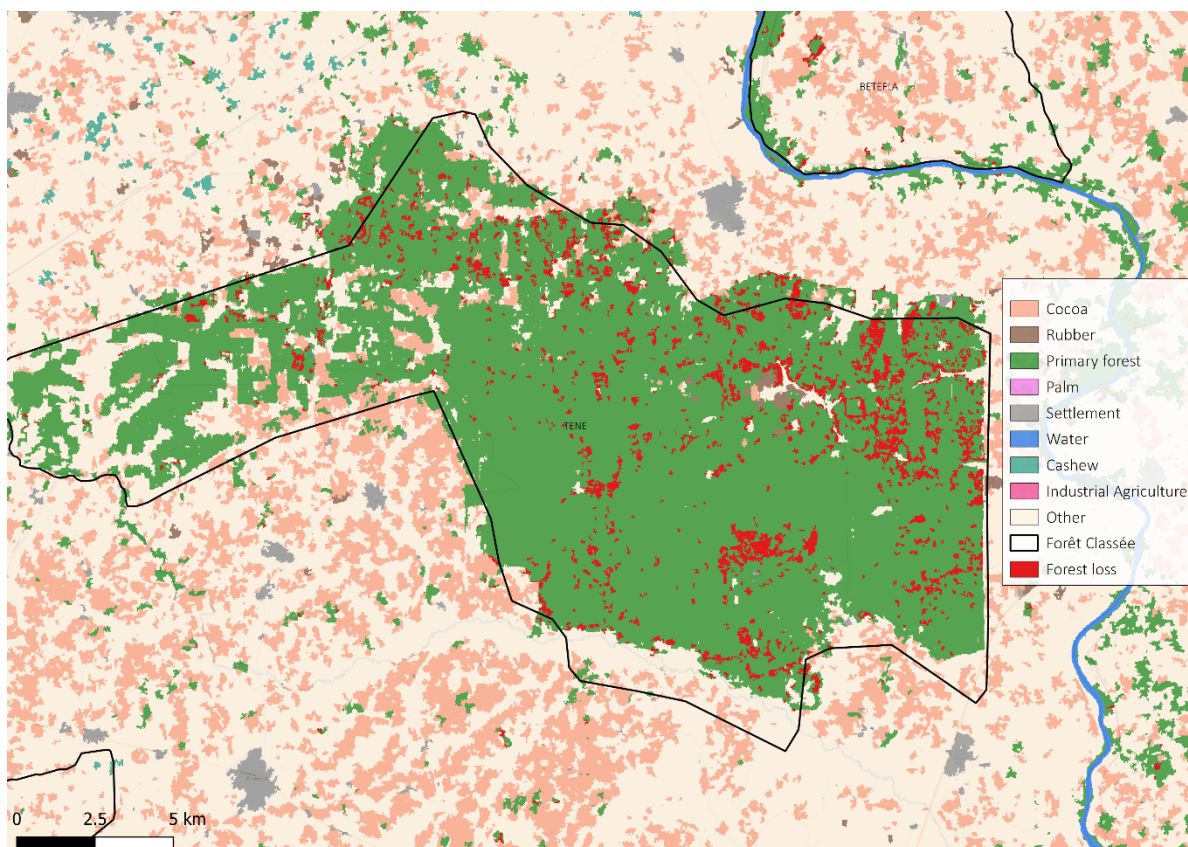
According to the limits assigned to Forêts Classées two to three decades ago, they should account for 4 million hectares. Since then, Forêts Classées have lost 85% of their initial size.

3.1 Forêt Classée de la Téné and Sangoué

The two most affected Forêts Classées, Forêt Classée de la Téné and de la Sangoué, have lost respectively 9% and 5% of their remaining forest between 2019 and 2020. Both protected areas are 20-30 kms from each other, in the central Gôh region. Forêt Classée de la Téné is the third biggest Forêt Classée in the country in terms of remaining forest surface, with over 24,000 hectares in 2019. It has lost over 9% of its forested area, 2,100 hectares, in one year, of great concern for one of the most intact protected areas in the country. Both Forêts Classées are managed teak plantations. While teak logging would explain dramatic losses of forest, 2019 IMAGES land use inventory detects illegal cocoa plantations in both Forêts Classées and illegal settlements in Forêt Classée de Sangoué.

Figure 6. Forêt Classée de la Téné, the third biggest surface of primary forest amongst Forêts Classées, is degrading dramatically as surrounding cocoa and rubber plantations expand





Source: Vivid Economics and RSAC, IMAGES (2020), <https://www.vivideconomics.com/images>

The case of Forêt Classée de la Sangoué shed light on the dramatic forest fragmentation of most Forêts Classées. Forêt Classée de la Sangoué illustrates the current state of most Forêts Classées. It is almost half the size it is meant to be, according to its limits, with remaining forest being extremely fragmented and cohabiting with cocoa plantations. Forest loss, in red, appears to be the result of legal teak logging or illegal cocoa farming, with the latter calling for increased surveillance.

Other neighbouring Forêts Classées, such as Plaine des Elephants, Sayota, Marahoué and Betefla have each lost more than 90% of their initial forest surface. According to the IMAGES 2019 land use inventory, cocoa and cashew plantations have taken over primary forest.

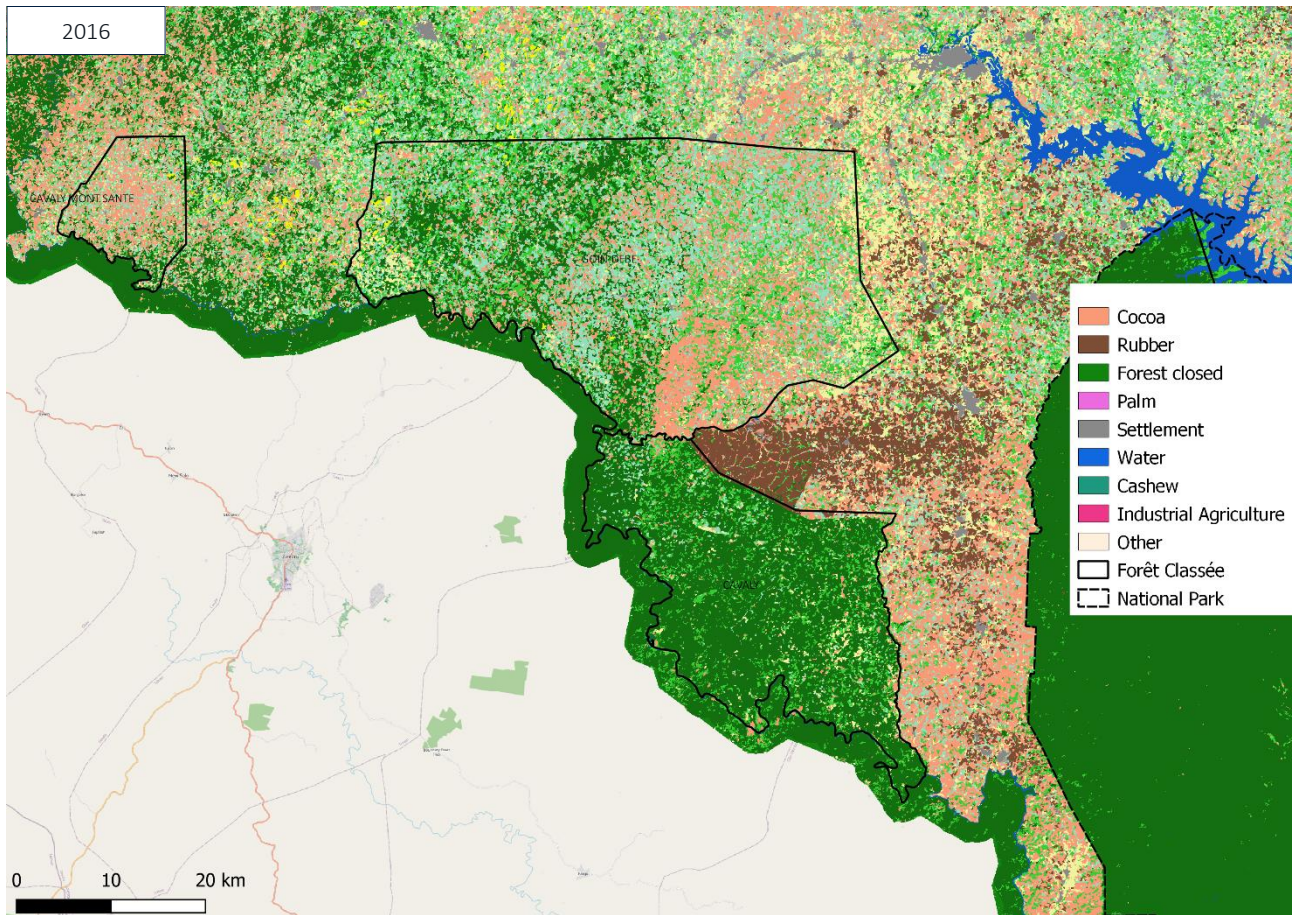
Further East, three other protected areas, Forêt Classée de Kamelenso, Abéanou and Bonguera, have lost in total over 2,014 hectares since 2019. All three protected areas are in the same regions that are undergoing dramatic loss of rural forests: Iffou and N'zi. They are surrounded by degraded forests and small-scale crops, as well as nascent cocoa and cashew plantations.

3.2 Forêt Classée de Goin Debé and Cavally

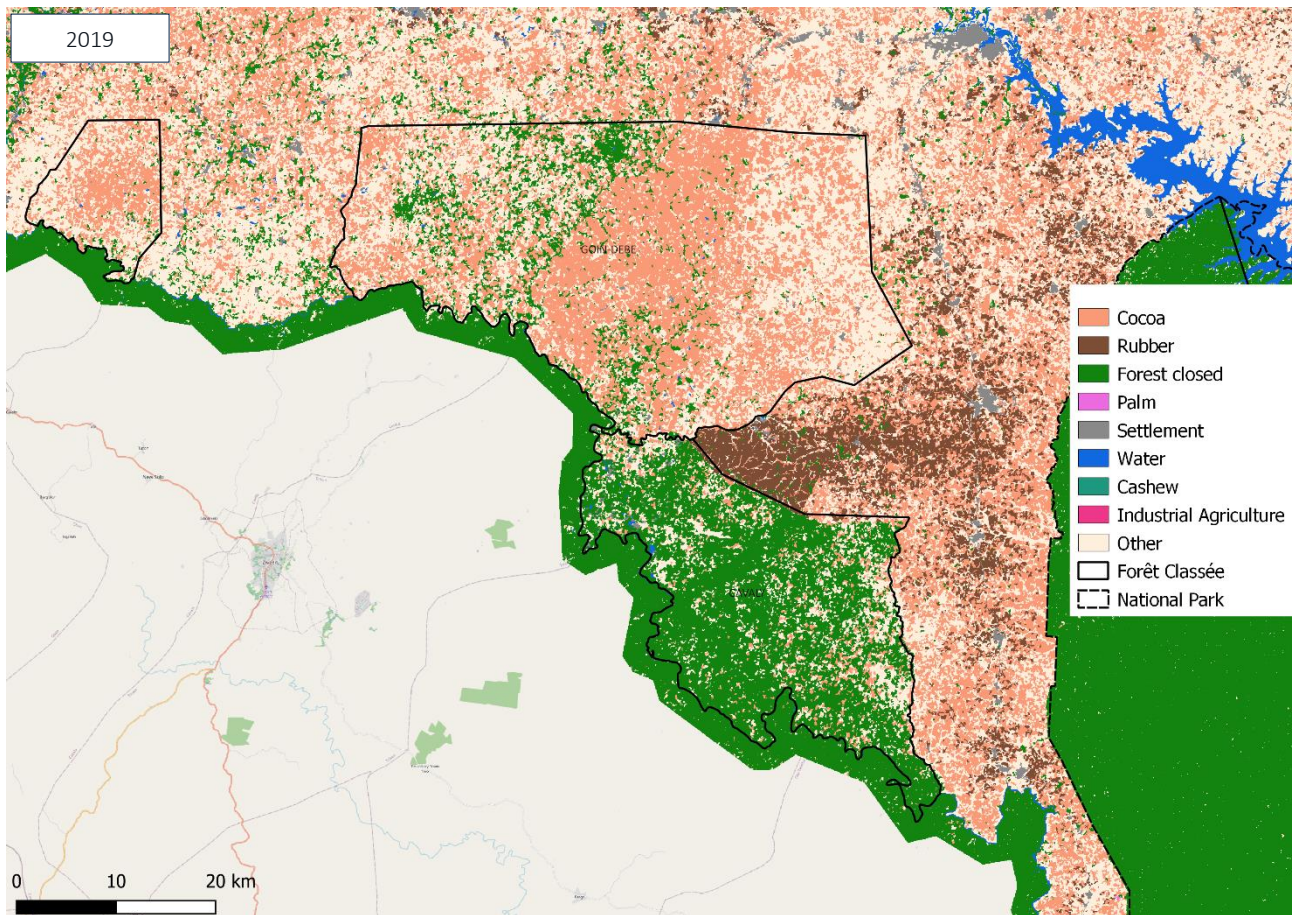
In the West, Forêt Classée de Goin Debé has lost more than 40% of its surface, almost 10,000 hectares, between 2016 and 2019. Between 2019 and 2020 it has lost further 216 hectares. Ground truthing of deforestation events in 2018 show that most of the recorded forest losses are due to cocoa plantations. This is confirmed by Figure 8, which compares 2016 IMAGES land use inventory to 2019 IMAGES land use inventory. Most of what had been identified as forest in 2016, and detected as a loss by IMAGES' Early Warning System, is now cocoa. The Forêt Classée de Goin Debé has lost 90% of the forest cover it was initially assigned.

Forêt Classée du Cavally, the largest remaining Forêt Classée, recorded stable deforestation rates for the second year in a row. Between 2016 and 2017, it had lost over 1,342 hectares, further increasing its fragmentation. Thanks to the forestry services actions, the annual losses have declined to 350-320 hectares in the past two years. Despite deforestation being slower, Forêt Classée du Cavally has lost more than 31% of the forest cover it was initially assigned.

Figure 7 While Forêt Classée de Goin Debé has lost 90% of its initial cover to cocoa plantations, Forêt de Cavally's cover remains somewhat stable after years of dramatic deforestation



State and Trends of Deforestation in Côte d'Ivoire (2019-2020)



Source: Vivid Economics and RSAC, IMAGES (2020), <https://www.vivideconomics.com/images>

4 National Parks and Reserves

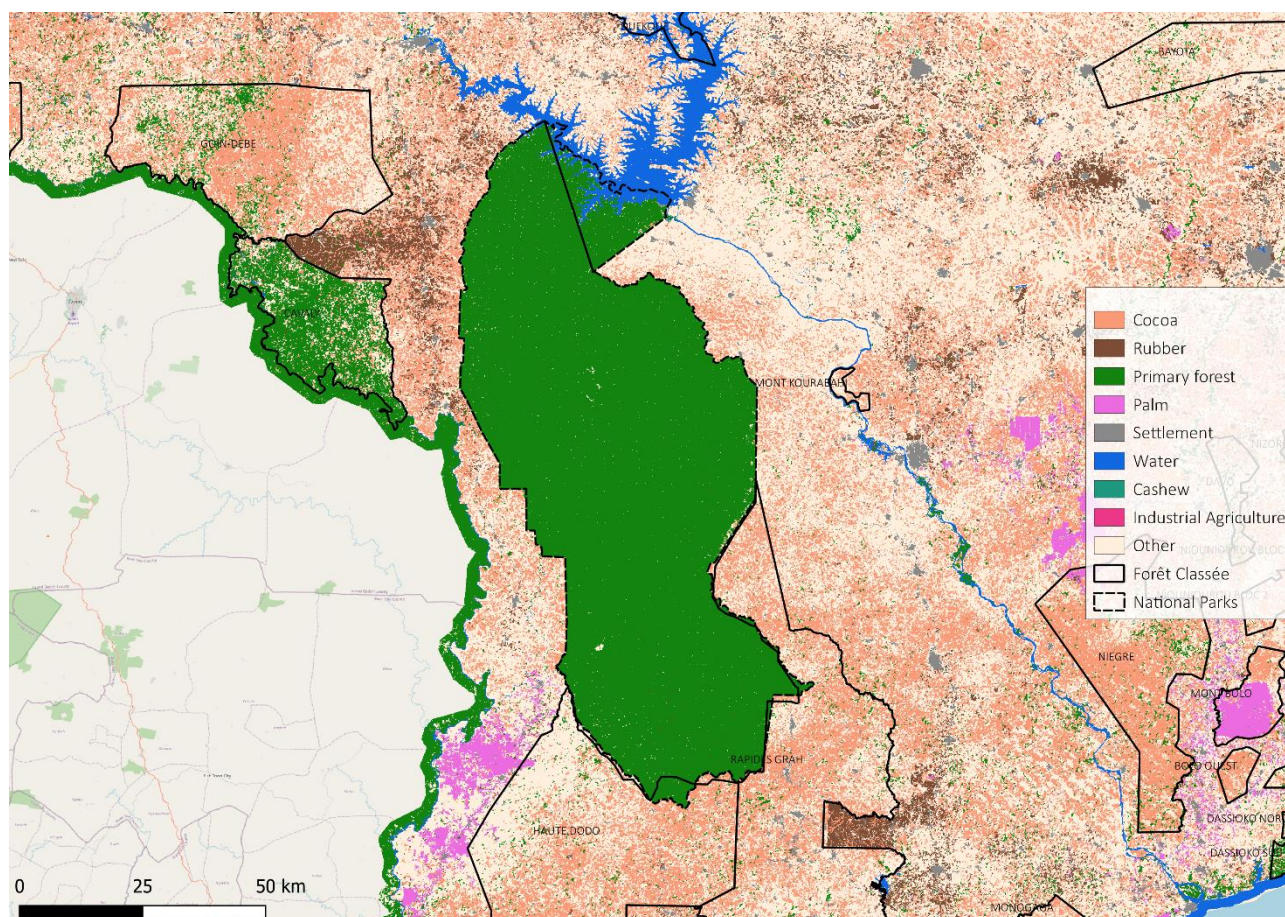
This section discusses the state and trends of deforestation in National Parks and Reserves.

Deforestation in National Parks and Reserves accounted for 3% of the country's forest loss between 2019 and 2020. National Parks and Reserves represent over 21%, 665,500 hectares, of Côte d'Ivoire's remaining forest. The surface of primary forest in remaining National Parks and Reserves is almost the same as Forêts Classées, yet National Parks and Reserves register 6 times less forest loss than Forêts Classées.

4.1 Tai National Park

The Tai National Park, pictured in Figure 9, accounts for more than 76% of National Parks and Reserves – that is, 17% of the country's remaining forest. Tai National Park's conservation is all the more impressive given the dramatic deforestation in neighbouring forests, Forêt Classée de Goin Debé, Rapides Grah and Haute Dodo. It is one of the last areas of primary rainforest in West Africa.

Figure 8 With over 530,000 hectares of primary forest, Tai National Park and Réserve partielle de Faune du N'Zo are the last area of intact forest in Côte d'Ivoire



Source: Vivid Economics and RSAC, IMAGES (2020), <https://www.vivideconomics.com/images>

4.2 Comoé National Park

IMAGES 2019 land use mapping registered over 44,000 hectares of isolated patches and gallery forests in the Comoé National Park. Located in the north-east of the country, the Comoé National Park, 1.1 million hectares, is made of open dry forests and savanna. More than 4% of the National Park, 44,000 hectares, are identified as primary forest and mostly appear to be gallery forests along water bodies or isolated forest patches.

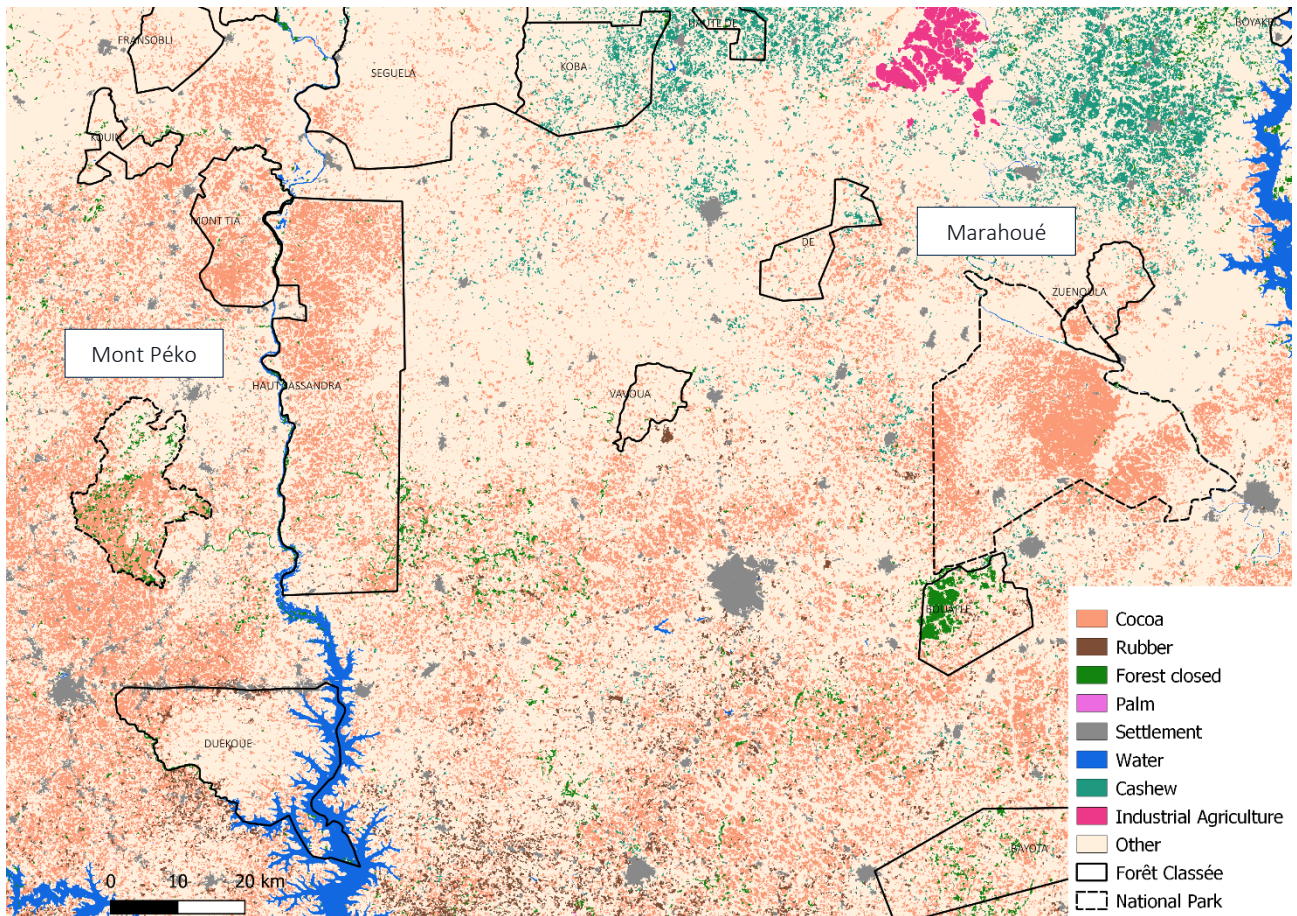
Between 2019 and 2020, IMAGES registered 759 hectares of primary forest loss, with causes that do not appear to be anthropogenic. Aside from a few alerts in gallery forests that could indicate the presence of illegal gold panning, most of the alerts triggered by IMAGES may be due to bushfires in certain forest islands, which could lead to the loss of tree leaves during the dry season. The cause of these losses remains to be verified by ground truthing.

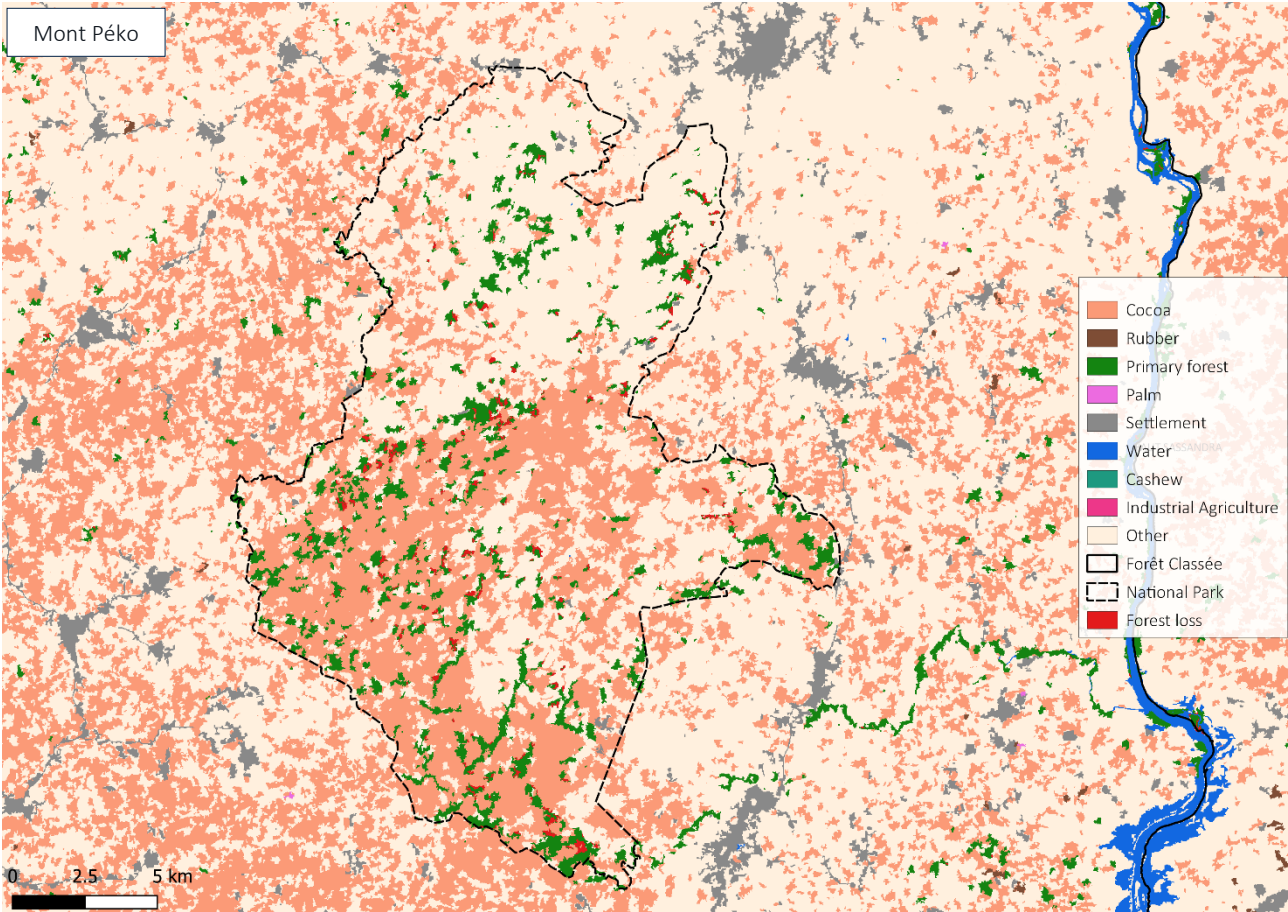
4.3 Marahoué and Mont Péko National Park

Previously known for its rich biodiversity, the National Park of Marahoué only registered 274 hectares of forest in 2019, which is 375 times less the area it was initially assigned. According to IMAGES 2019, cocoa plantations have replaced what used to be primary forest.

The Mont Péko National Park underwent strong deforestation, with 11%, 351 hectares, of its remaining forest lost over the past year. Between 2019 and 2020, the National Park of Mont Péko lost 1.5 times more forest than it had between 2016 and 2019. As of 2019, it registered a forest surface 10 times smaller, than what it was assigned initially, 30,200 hectares. According to IMAGES 2019, cocoa plantations have replaced what used to be primary forest.

Figure 9 Forest in National Parks of Mont Péko and Marahoué has been replaced by illegal cocoa plantations





Source: Vivid Economics and RSAC, IMAGES (2020), <https://www.vivideconomics.com/images>

5 Conclusions and recommendations

The last dry season has seen a significant loss of primary rural forests in the Centre-East and West of the country. They have left a landscape of fragmented forests at higher risk of further deforestation. The authorities could put in place strong protection and enforcement resources to the last intact islands of rainforest in the Eastern and Western parts of the country. In parallel, to reduce forest degradation, authorities could incentivise local communities' involvement in reforestation, and later monitoring, large areas of land.

Ground truthing of alerts triggered IMAGES Early Warning System could help identify the cause of forest loss and assist forestry services in their monitoring efforts.

The remaining dense islands of primary tropical forest can now be found in a handful of protected areas such as Forêt Classée de Yaya and Bossematié as well as Parc National de Tai. Three protected areas appear to resist the dramatic deforestation trends elsewhere in the country. Forêt Classée de Yaya and Forêt Classée de Bossematié remains one of the best protected Forêt Classées. With more than 510,000 hectares of primary forest and low forest loss rates, Tai National Park shows that protection of the forests can be effective. These effective methods of protection should be extended to areas such as Forêt Classée de la Téné, where deforestation rates are very high.

About IMAGES

IMAGES is an interactive online platform that offers a variety of spatial and economic data and tools to help monitor the forest cover and assist in a wide range of spatial planning tasks.

IMAGES was created in 2016 for the Ivorian government and other key stakeholders to some of the country's needs in tackling deforestation. The IMAGES system is now in use in South West of Côte d'Ivoire and is being maintained by the Ministry of Planning and Development. IMAGES forest loss maps are updated every 12 days, highlighting recent forest loss alongside strategic land use planning data. Note that forest loss may not always be deforestation. Forest loss may be due to different factors including deforestation, logging, fire, mining or uprooted trees

IMAGES was co-financed through the UK Space Agency's International Partnership Programme (IPP) and delivered by Vivid Economics and Remote Sensing Applications Consultants (RSAC), two UK-based SMEs. It is now run by the Ministry of Planning and Development, Ivory Coast. The UKSA's IPP seeks to maximise the practical impact on the lives of those living in developing countries by partnering with developing countries to use space solutions to solve their specific development challenges, and in doing so increase their capacity to take action.

Are you interested in joining the IMAGES partnership? Email us at: paola.despretz@vivateconomics.com

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