Case Study

FORESTS 2020

Collaboration and Impact Stories

ecometrica

"By partnering UK expertise and international institutions responsible for forest monitoring, Forests 2020 advocates co-development, learning and collaboration to address these technical challenges and produce monitoring tools that help understand how forests are changing, where forests are at risk and communicate the results effectively."

Sarah Middlemiss,
COO, Ecometrica

The UK Space Agency's International Partnership Programme (IPP) is a five-year, £30 million per year initiative designed to utilise the UK space sector's research and innovation strengths to deliver measurable and sustainable economic, societal and/or environmental benefits to developing countries.

Projects within IPP span a variety of themes including: building climate/disaster resilience; improving agriculture; reducing deforestation; preventing and reducing maritime pollution and illegal fishing; optimising renewable energy production; and improving access to appropriate and affordable financial services.

IPP is funded from the Department for Business, Energy and Industrial Strategy's (BEIS) Global Challenges Research Fund (GCRF). This £1.5 billion Official Development Assistance (ODA) fund supports cutting-edge research and innovation on global issues affecting developing countries. ODA-funded activity focuses on outcomes that promote long-term sustainable development and growth in countries on the OECD Development Assistance Committee (DAC) list. IPP is ODA compliant, being delivered in alignment with UK Aid Strategy and the United Nations' (UN) Sustainable Development Goals (SDGs).

Forests 2020 is a £14.9 million investment by the UK Space Agency as part of the International Partnerships Programme.
The project aims to protect and restore up to 300 million hectares of tropical forests using advanced applications of satellite data in 7 partner countries. Forest resources are being lost at an unprecedented rate with catastrophic implications for ecosystem health, animal habitats and climate change. Alarmingly, if forest loss is allowed to continue, we risk forests converting from a carbon sink that mitigates climate change, to a carbon source that contributes to it (Mitchard, 2019).

In response to these problems, Ecometrica has partnered with UK Earth Observation experts from the Universities of Leicester and Edinburgh with an international consortium of organisations based in Kenya, Ghana, Mexico, Colombia, Indonesia and Brazil to address gaps and challenges in their forest monitoring systems to tackle loss of forests and improve governance.

Why use satellites?
Earth Observation is widely recognised as the only practical way to monitor the condition and use of forests at regional, national and international scales. The recent influx of freely available data, especially since the launch of the European Copernicus programme, offers an opportunity to improve the accuracy and speed of national forest monitoring at a cost that is accessible and sustainable for developing and emerging economies.
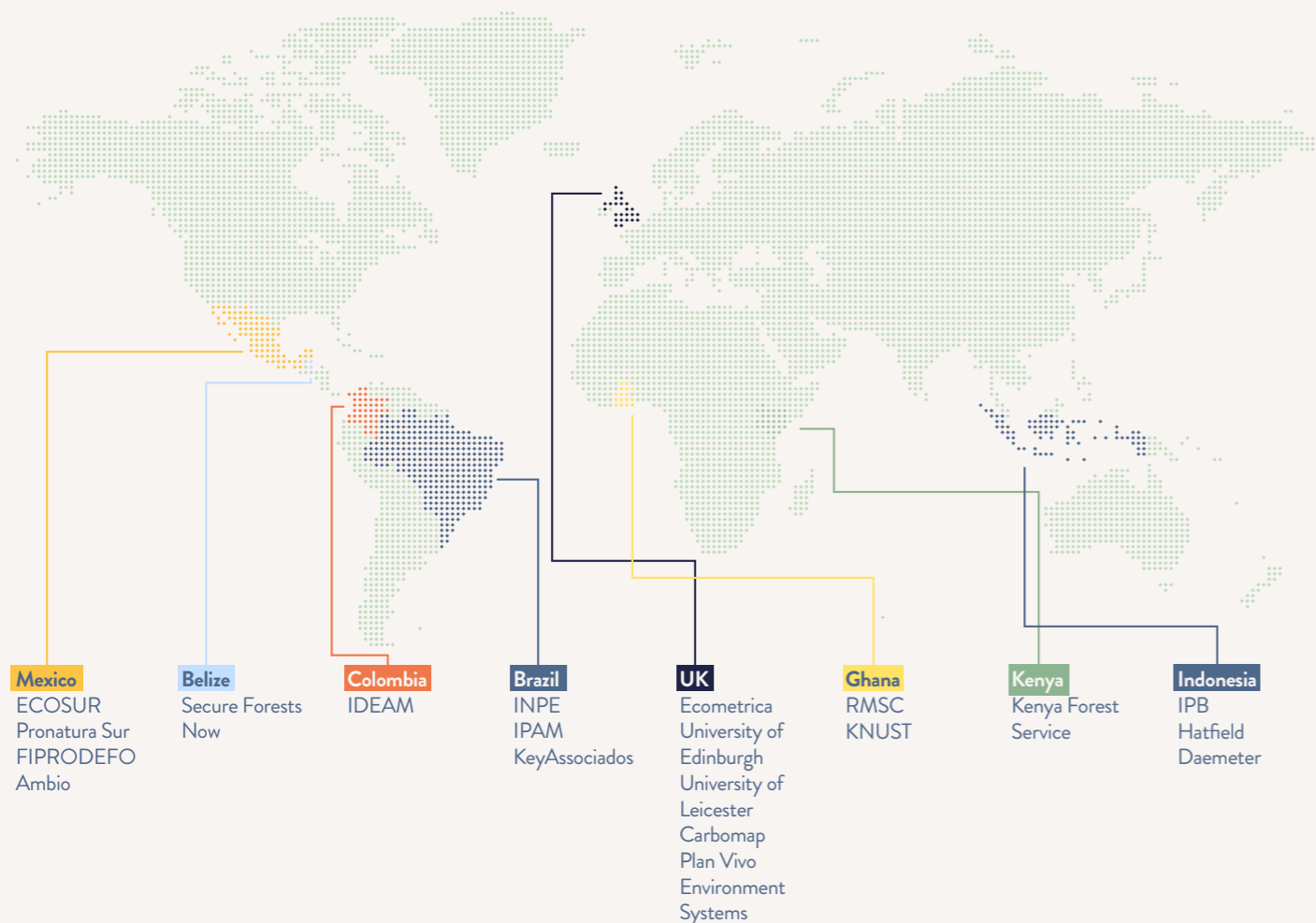
While there is a constant stream of new satellite data from numerous constellations, there are technical challenges to overcome before countries can use the data effectively to help protect and restore their forests.
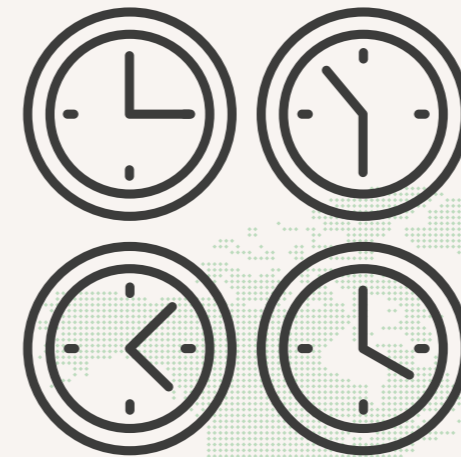
The Forests 2020 Approach
Ecometrica led the project and designed its structure with impact and sustainability in mind.

Our approach has resulted in some outstanding examples of collaboration and impact that use space technologies to monitor the health of forests, contribute towards their protection and support their case for restoration across the world.

Project Partners

Mexico
ECOSUR
Pronatura Sur
FIPRODEFO
Ambio

Belize
Secure Forests
Now

Colombia
IDEAM

Brazil
INPE
IPAM
KeyAssociados

UK
Ecometrica
University of
Edinburgh
University of
Leicester
Carbomap
Plan Vivo
Environment
Systems

Ghana
RMSC
KNUST

Kenya
Kenya Forest
Service

Indonesia
IPB
Hatfield
Daemeter
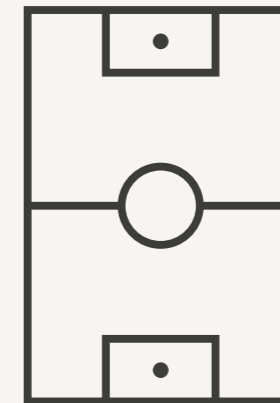
Our Impact

7
Countries
Timezones

22
Partners

4
Years

> 1 million ha
Avoided forest loss
(825,000 football fields)

541
People trained
in using new
EO tools

78
Scientific
publications

94 million
Hectares of forest
monitored

US$ 300 million
million payments made to partner countries
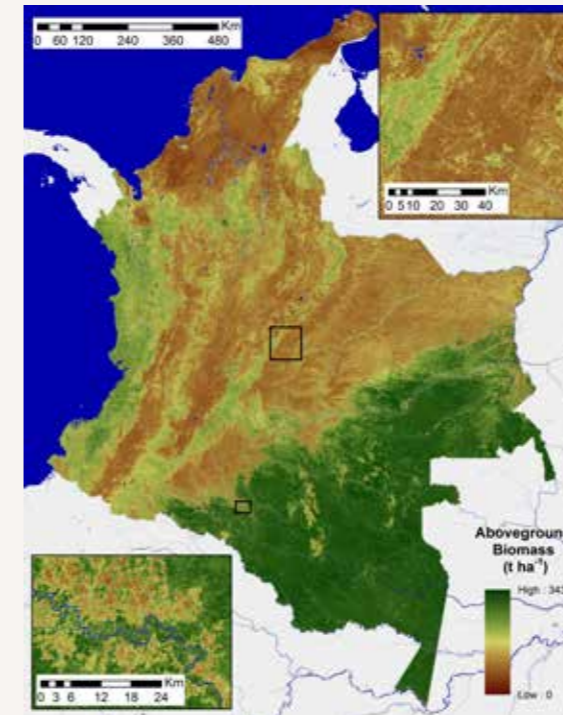through results based payments for REDD+

> £100 million
UK ICF investments in forests monitored

Forests 2020: Colombia

"In Colombia, Forests 2020 is working with IDEAM - the Institute of Hydrology, Meteorology and Environmental Studies - who are responsible for national forest monitoring. Our priority was to understand IDEAM's challenges from the outset, and co-develop solutions that can help increase the processing speed, improve scale and accuracy of the forest and carbon monitoring system that is used by the national and regional governments, as well as NGOs to respond to deforestation alerts"

Felicia Line,
Forests 2020 Coordinator, Latin America

Forests 2020 has supported the following innovations in Colombia through collaboration between IDEAM, the University of Andes, Ecometrica and the University of Leicester.

Biomass Mapping
Forests are an integral part of the global carbon cycle, and monitoring biomass is of key importance to understand levels of carbon being emitted into the atmosphere through forest loss. Estimating biomass is a challenging task, especially in areas with complex forest stand structures and environmental conditions (Otukei and Emanuel, 2015).

An aboveground biomass map had only been generated once in Colombia. Through Forests 2020, the University of Leicester have supported IDEAM in the generation of a (year) biomass map using multispectral Landsat 8, synthetic aperture radar (SAR) ALOS-2 PALSAR-2 satellite imagery. SAR satellites are better suited to monitoring biomass, because the sensors transmit long wavelengths through the atmosphere that can understand the geometric structure of forests day-and-night, and in all weather conditions. The biomass

map will be used for reporting carbon stocks to donors, and eventually reporting greenhouse gas emissions from the land use change sector to the UNFCCC and World Bank.

Forests 2020 supports countries with international reporting to donors and multilateral entities such as the World Bank as part of results-based payments programs, part of which is used for investment in the forest monitoring systems, and it incentivises countries to take actions to reduce deforestation and provides support to the monitoring of global commitments to forest protection, such as the Paris Agreement.

Early Warning Deforestation Reports
Prior to the Peace Deal, Colombia's forest areas were implicated in the longest running domestic conflict of the Americas. In 2016, the Peace Deal was struck between the government and the Colombian Revolutionary Army (FARC) where the FARC were disarmed, and converted into a political party. Whilst a step forward for reducing conflict in Colombia, an unintended effect was that much of the FARC land territory is now being exploited by criminal mafias, land grabbers, and other

groups. With no forest protection, these areas became "free" to whoever claimed them first, initiating a race to seize available lands. As a result, it is estimated that deforestation in Colombia has increased by over 25% since the peace process began.

In the midst of these changes, UOL have provided training to IDEAM on the ingestion of Sentinel 1 satellite imagery into the Colombian Datacube to produce quarterly early warning deforestation reports. Through improvement of this product, using the new Sentinel 1 and 2 images, Forests 2020 has supported improving the accuracy and timeliness of these early deforestation warning alerts for the national and regional governments to respond and protect the remaining forest cover in Colombia. In 2019 the National Council against Deforestation and other Environmental Crimes (CONALDEF Spanish acronym) was established and military operations launched to prosecute deforestation events. These operations are informed directly by the weekly and quarterly deforestation reports produced by IDEAM, and deforestation rates at the national level have reduced by 10% in 2018 compared to 2017 and by 19% in 2019 compared to 2018,

according to official IDEAM data.

Zero Deforestation Commodities
A palm oil map to monitor the zero deforestation agreement with the palm oil sector has been completed using the CDCOL and validated with a user accuracy of 79% and overall estimated accuracy of 92%. The Government of Colombia, along with private sector and NGO stakeholders, have entered into Zero-Deforestation Agreements for key export commodities: palm oil, cocoa, beef, and dairy. These are public-private partnerships to end deforestation in key supply chains. Since the project's end, IDEAM, Ecometrica and the Ministry of Environment (MADS) are in ongoing discussions on how to use the Ecometrica Platform and IDEAM data to monitor these agreements long term.

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Forests 2020: Mexico

"In Mexico, Forests 2020 is working with 5 organisations who work at the local, state and national level to integrate forest monitoring and improve information flows at these different levels. We have tested forest monitoring innovations in window areas and then scaled these up to the state and national level. We have engaged a wide variety of stakeholders, from communities, scientists, campaigners and state and national level government officials to respond to different forest monitoring needs."

Felicia Line,
Forests 2020 Coordinator, Latin America

In Mexico, Forests 2020 has focused on improving land use classification and land use change maps at the state and national level, improving deforestation and fire risk mapping, and improving the alignment and information flows from the national to the state level.

This has resulted in improved forest cover and change maps for five key states in Mexico by the National Forestry Commission (CONAFOR), which have been adopted by the Federal Government and the state government of Jalisco as the baseline to evaluate public policies. The information on historic deforestation from 2000 to 2018 was also improved, and has been submitted to the United Nations Framework Convention on Climate Change (UNFCCC) and will facilitate the access to funds from the Green Climate Fund (GCF) and World Bank.

Measuring forest degradation is a challenge in **all Forests 2020** countries for many reasons:

- Activities causing degradation such as fire, forest pests, coffee plantations, selective logging, mining and charcoal production produce loss of forests that vary across the area/intensity interface, making it very difficult to quantify. As a result, some estimate degradation to be a 3-10 times larger source of greenhouse gas emissions than deforestation itself.
- Scientists have not yet defined whether degradation is considered a 'process' that forests experience, or a 'state' in which a forests live.
- There are discrepancies between natural (caused by elephants) and unnatural (caused by selective logging) degradation.
- Even the newest earth observation satellites, like Sentinel 1 and 2, are not suited to detecting degradation.

(Bowers, 2018)

When Forests 2020 began in Mexico, there was no accurate estimate of forest degradation resulting in uncertainty around its impact on carbon emissions from forest loss.
The University of Edinburgh supported the states of Chiapas and Jalisco to measure forest degradation by establishing 28 large forest measurement plots, and calibrating ALOS Palsar radar images to create biomass maps. The degradation estimation maps will assist

"I developed the rapid field data collection method, created field manuals and travelled to Mexico to deliver a training session for AMBIO and FIPRODEFO. My research has found that larger unmarked plots are more suitable for measuring biomass change as a proxy for degradation, and can be used for calibration with ALOS PALSAR."

Dr Charlotte Wheeler,
University of Edinburgh

"FEMEXPALMA are firmly committed to developing a sustainable palm oil industry in Mexico, while protecting our forests and biodiversity. Working with key partners to create an effective monitoring system – underpinned by a world-leading technology platform – we believe we are in strong position to grow our industry, in a sustainable and environmentally responsible manner."
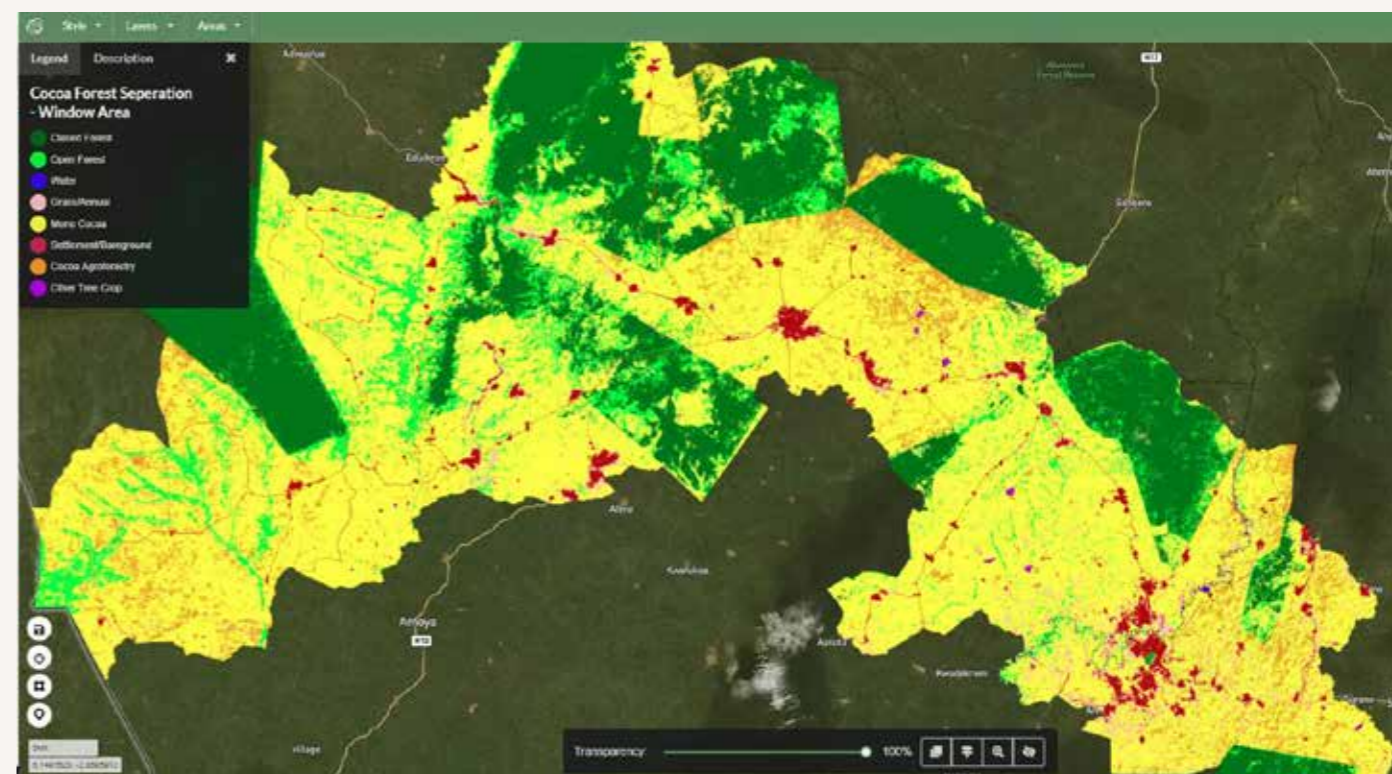
José Luis Pérez Vázquez Aldana, Executive President of FEMEXPALMA

Mexican partners to estimate greenhouse gas emissions stemming from forest degradation, which could be included in future reports by Mexico to the UNFCCC and the World Bank, as forest degradation is currently not accounted for in Mexico's emission reference levels. The combination of Dr Wheeler's training and the data sharing functionality of the ecometrica mapping platform, has helped develop an online repository for monitoring field plots and assisting with degradation measurement in Mexico.

Mapping Platform for Data Sharing
El Colegio de la Frontera Sur (ECOSUR), a research institute that is based in South Mexico, is using the Ecometrica Mapping Platform (EO Lab) to disseminate improved data products and maximise the impact of their research, and they have renewed a license to the platform beyond the end of the project.. ECOSUR have worked together with field partners Pronatura Sur and AMBIO to upload photos and videos of field plots to validate the land use and land use change maps for the window areas, which you can view here:

http://areasventanamexico.forest2020-mx. ourecosystem.com.

These outputs can also be used by private sector actors to maximise sustained impact. In 2020, Ecometrica signed a deal with the Association of Mexican Palm Oil Producer, FEMEXPALMA, to use satellite data to monitor and safeguard sustainable land use practices, including the protection of forests and biodiversity.

Global palm oil production reached record heights in 2020, but concerns remain over its environmental, economic and social impact. Harnessing insights from this project and mapping data from Mexico's Federal research institution El Colegio de la Frontera Sur (ECOSUR), the FEMEXPALMA monitoring system is deployed on Ecometrica's mapping platform and supported by in-country technicians at Frontierra. FEMEXPALMA will use the platform to support members implement more sustainable practices and work towards certifications such as RSPO.

Forests 2020: Ghana

"The new national land use and land cover map is an important outcome from the Forests 2020 project, which has enabled us to create a resource centre from which we will further develop our new land cover map. Importantly, FCG and our partner agencies will now be in a much stronger position to determine progress towards the Cocoa & Forests Initiative objectives and other international commitments and initiatives."

Dr Yakubu Mohammed,
Manager of GIS and Mapping Department, RMSC

Monitoring Forest Risk Commodities
In Ghana 15% of high forest zone deforestation can be attributed to cocoa production. Cocoa is an important agricultural commodity in Ghana; 25% of the world's cocoa supply originates there and cocoa exports contribute to around 7% of GDP as well as one quarter of national exports.[1] However, increased cocoa production is also a key driver of forest loss, and shade loving varieties of the crop, which are prominent in Ghana, are extremely challenging to detect from satellites. One of the biggest challenges Forests 2020 partners faced was the ability to disaggregate cocoa tree crops from natural forest.

As the consumer demand for sustainable products has grown, many chocolate companies have commited to deforestation free supply chains. In 2018, the government of Ghana and chocolate producing companies signed up to the Cocoa and Forests Initiative (CFI), headed by the World Cocoa Foundation. This has spurred urgent action to address the above challenge as the Ghanaian government, NGOs and the cocoa sector require detailed information about where cocoa is grown and sourced from, in order to meet their deforestation free chocolate commitment.

Experts at the University of Leicester have worked together with RMSC to develop a processing chain which uses Sentinel 2 satellite imagery to segregate monocrop cocoa plantations, agroforestry cocoa plantations and natural forests. The UOL team travelled to Ghana in late 2018 and gained local knowledge from RMSC about identifying the differences between monocrop and agroforestry cocoa plantations. By co-developing a flexible system that automates a raw satellite image to user required products, RMSC have produced a national land use & land cover map that effectively distinguishes cocoa and other tree crops from natural forest and has been uploaded to the Ecometrica mapping platform. The map is a multipurpose product that will be updated over time and used for national climate change reporting under the UNFCCC Paris Agreement; enforcement of compliance with zero deforestation commodities including timber, cocoa and other exports; and planning and monitoring projects and policies in the forest and land use sector.

These improved datasets are useful to initiatives like the CFI and the government of Ghana because they can be overlaid with commercial companies' supply chain data to identify encroachment onto protected areas and show if the crops are agroforestry or monocrop.They will form the cornerstone of a national service for all export commodities providing assurance on zero deforestation. In response to market requirements for assurance that products exported from Ghana are not linked to deforestation, the Ghana Forestry Commission is piloting an official compliance service for Ghana's agricultural and extractive commodities via the Ecometrica Platform. Companies can overlay their supply chain (i.e farm boundaries) with official data.to receive a compliance report, as well as identifying areas at risk of deforestation and non-compliance. Part of the revenues from the service will be reinvested into the Forestry Commission forest monitoring system so that maps can be updated and the system becomes self-sustaining.

"The growing demand for cocoa is driving deforestation in West Africa and other forest-rich areas. Ambitious trade policies and governance reform can help to support more sustainable production practices, and so alleviate some of the pressures on land and forests while transforming the lives of the 5 million smallholders who feed chocolate-lovers worldwide."

Chatham House, (2019)

Forests 2020: Kenya

Over the last 50 years, Kenya's forest cover has reduced from around 12% to 7.4%. This is a result of numerous activities including tea production, charcoal production, tourism and energy sectors.

Protecting Kenya's remaining forest cover, and increasing it to 10% by 2030 is a national priority. In recent years Kenya has suffered from severe drought leading to strains on agricultural systems and leading to tensions and conflict between pastoralists and land owners. Forests play a vital role in the water cycle and reforestation is an important strategy to mitigate these negative outcomes.

To address this need, the University of Leicester have supported the Kenya Forest Service to develop and implement a Near Real Time Forest Alerts (otherwise known as the Forest Sentinel system) which aim to improve the response time of KFS staff (forest rangers) and Community Forest Associations (CFA) to external forest-related incidents, such as illegal deforestation. Forest Alerts draws on high resolution visible images from Sentinel-2 satellite, processed through Python for Earth Observation (PyEO) software to enable rapid, near real-time identification of areas of deforestation, followed by the production of alerts via emails or mobile apps to end users. It has been trialed under the Forests 2020 project in collaboration with University of Leicester (UOL). Initially focusing on the Shimba Hills, Kwale county and Buda area, KFS' Forest Information Systems staff, forest rangers and forestry officers as well as Community Forestry Association (CFA) rangers have been trained to operate the system.

The forest alerts increase the accuracy of reporting on forest disturbance. Prior to using the Forest Alert system, there was a lot of 'editing' but now reports go straight to the office of the Chief Conservator of Forests which has helped to increase accountability and transparency. KFS' Board of Management was reportedly impressed to see the Forest Alerts being used in the field in December 2020. After March 2021, KFS is planning to continue to roll out the Forest Alert programme to five other counties (Baringo, Elgeyo, Markwet, Aberdares, Mount Kenya and Mount Elgon) and are considering increasing the involvement of communities in the roll out the alerts. CFAs and Kenya Wildlife Service scouts are already involved.

Forests 2020: Brazil

According to information provided by the National System for Forest Information (SNIF), approximately 495 million hectares of Brazil (58% of its territory) is covered by natural and planted forest, making it the second largest forest area in the world after Russia.

There are six continental biomes including the Amazon, Cerrado, Atlantic Forest, Caatinga, Pampa and Pantanal, each with different forest cover and population distribution, as well as environmental protection and importance. The Amazon biome covers almost half of the national territory, representing about 8% of the world's remaining forests. The second largest biome is the Cerrado and is characterized by savannah vegetation. Both of these biomes, (especially the Amazon and Cerrado) and their forests are threatened by economic activities and social demands that compete for space with forests.

When Forests 2020 began, the Amazon was well monitored using a robust forest monitoring system. The main challenge for Forests 2020 partners was the Cerrado because there is a different forest structure and different drivers of forest loss. To enable efficient management, the Cerrado biome needed to be better understood.
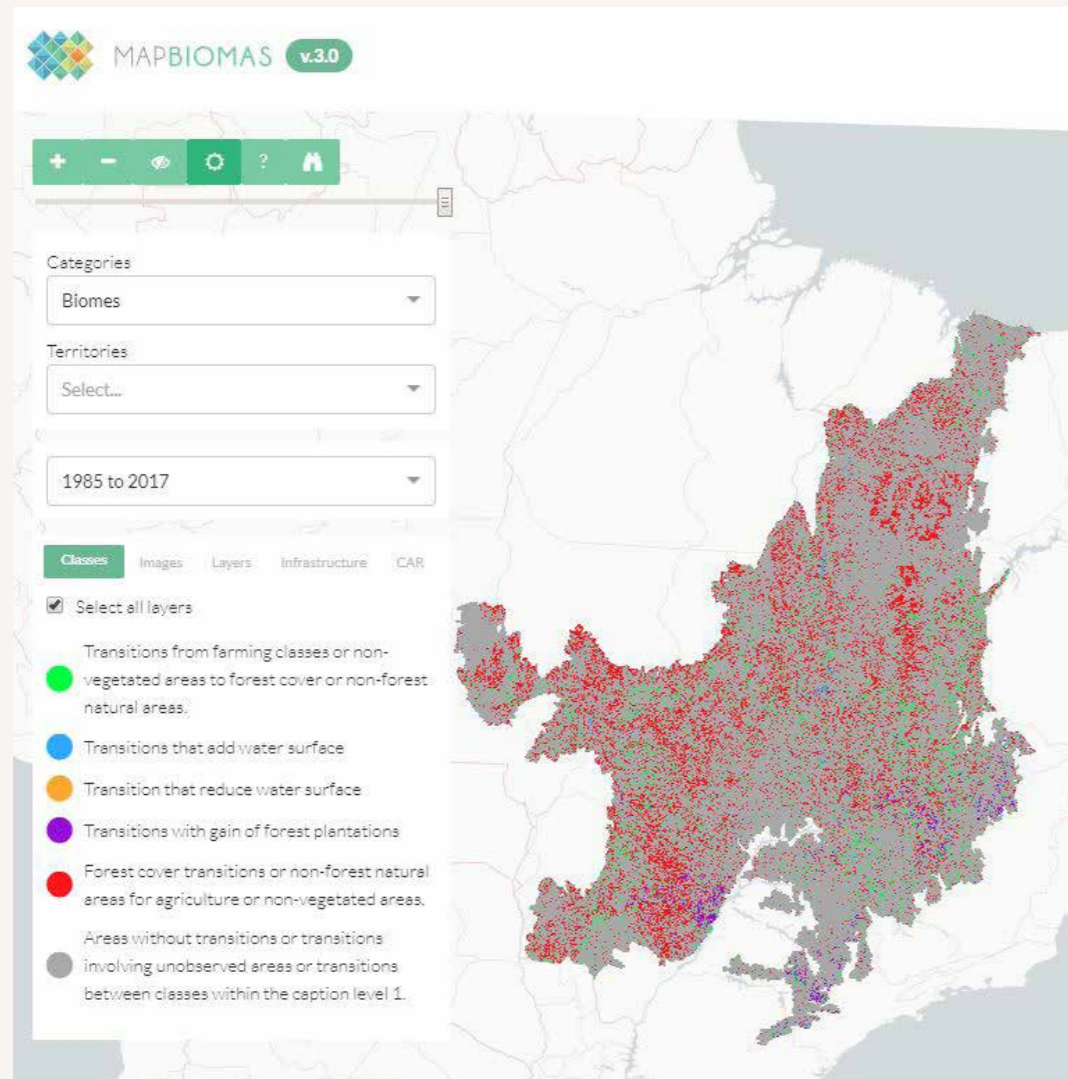
In response to these needs IPAM began developing innovative approaches to monitor land use and cover change within the Cerrado biome, and analyse the results to identify critical areas of habitat change. In April 2017, they released the first collection of Cerrado biome land cover and land use maps from 2000-2016, as well as critical areas of deforestation during this period. These annual time series maps show types of forests, savanna and grasslands as well as agriculture and pasture developed through the MapBiomas Network.

Using Ecometrica Mapping, partners in Brazil have begun developing applications and data products to support deforestation free commitments in supply chains. According to the study "Securing investments in forest monitoring and protection" one of the major pathways for justifying resources for improved monitoring and forest conservation actions is external, international pressure related to sustainability certification of commodity crops and forest products (Kelly & van der Horst, 2018). In this scenario, a country needs

to build capacity to assess, monitor and certify in order to comply with requirements set by importing countries, and the challenges to producers to comply and follow emerging protocols for certification is strong stimulus for robust data on forest change.

Brazil is exposed in hybrid form to this pathway - it is a huge exporter of high value commodity crops such as soy which buyers are placing increasing importance on demonstrating minimal impact on deforestation, and there are also strong domestic policies at both federal level and more local (e.g. biome) that require strong data input. There is also considerable market pressure from production companies such as Unilever, McDonalds, Tesco and Walmart who have joined the FAIRR Initiative which support deforestation free commodities in the Cerrado.

With this in mind, Forests 2020 has developed data products and applications on Ecometrica Mapping that could be used to help the private sector monitor their forest protection commitments such as the Brazilian Forest Code. Large agricultural exporters face increasing pressure from international markets to provide evidence of compliance with sustainability standards, and the financial sector, in particular rural credit lenders, need to monitor and ensure landowners are compliant with the Forest Code before administering loans and credit. Key Associados are working with INPE and IPAM to build a showcase of applications and engage with the private sector to help understand their needs and products Forests 2020 could provide.

According to Greenpeace, in the last half century more than 74 million hectares of Indonesian tropical forests have been burned, logged or degraded.

There are a number of estimations of the Indonesian deforestation rate, resulting from various studies. This is usually due to differences in methodologies, for instance disagreement on the definition of deforestation and the inconsistencies in visual classification methods.

One of the challenges Indonesian partners faced when improving their forest monitoring was moving from a manual to a consistent and systematic approach of digital forest classification to provide the extent of forest cover and the annual changes for the whole of Indonesia.

Before Forests 2020 began, land cover maps of Indonesia were produced using imagery from the Landsat satellite and processed using manual methods meaning land cover maps took up to 2 years to produce. To address this challenge IPB, Forests 2020, LAPAN (The Indonesian Space Agency) and the Ministry of Environment and Forestry (MOEF) signed a Memorandum of Understanding (MOU) to work together to create algorithms which automate satellite imagery processing and integrate them into the national forest monitoring system.

Over the course of Forests 2020 IPB have worked with the UOL to develop algorithms for:

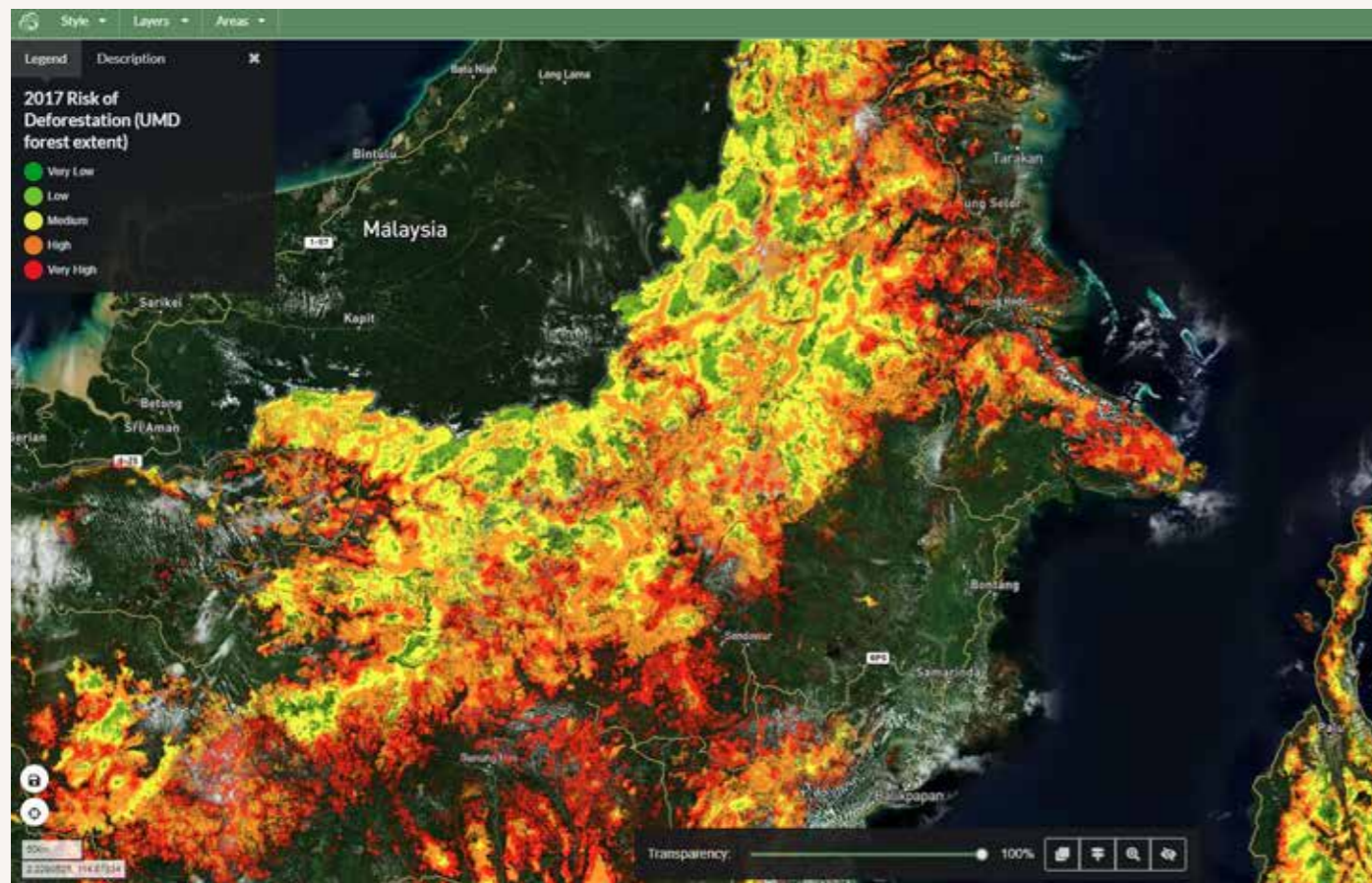- Cloud/cloud shadow masking in satellite

images which enables forest change to be detected more easily
- Topographic correction which reduces the influence of atmospheric and solar illumination and improves the results of change detection and classification algorithms
- Canopy Closure estimation to support degradation monitoring

A key aspect of the National Forest Monitoring System (Simontana) is its ability to detect and report on changes in forest area and forest condition. Using improved data obtained from LAPAN, MOEF is now able to more accurately and more rapidly detect changes in forest area (through deforestation alert). Through the adoption of IPB algorithms, forest degradation is now being incorporated into annual reporting the Climate Change Directorate within MOEF. A further key result reported by MOEF-Planology is improvements in forest classification. The speed and accuracy of this process has been improved as a result of algorithms developed by IPB through Forests 2020, resulting in the generation of more accurate maps, capable of accurately differentiating the 23 forest types provided for under Indonesian law.

Since 2016, there has been a decrease in deforestation in Indonesia. While there are many policy related interventions that can be attributed to this decrease, improved law enforcement has been identified as a key factor, which can be linked to the improvements to the national forest monitoring system supporting by Forests 2020.

Forests 2020: Belize

In 2019, Forests 2020 expanded its activities to Belize.

In 2018, natural forest cover in Belize accounted for approximately 58.8% of total land cover with average forest loss between 2000-2018 approx. 0.4% per annum, with conversions to cropland, grassland, settlements, and wetlands (Forest Department 2019). Much of this deforested land is now agriculture which has converted large areas of central and northern Belize, partly destroying the critical biological connectivity between the lowland Maya Forest with the key biodiversity hotspot of the Chiquibul-Maya Mountains. Over the same time-period some areas in the west of Belize, along the border with Guatemala, have been damaged by illegal logging, hunting, and poaching. These activities not only threaten the natural ecosystems, but also adversely affect the portion of the population that is dependent upon forests and forest resources for their economic growth and prospects, particularly those in the eco-tourism business.

Forests 2020 sought to address deforestation associated with illegal logging in protected areas and the conversion of forest land for agriculture by working with Secure Forest Now (SFN). SFN is a collaborative forest security and protection solution that aims to empower local forest rangers to operate with increased safety, awareness, and effectiveness in the prevention of illegal logging and poaching activities. Working with Rainforest Concern, Pook's Hill Nature Reserve (PHNR), Survival Wisdom and other consultants, SFN implemented the Forest Domain Awareness System (FDAS) in Pook's Hill Nature Reserve, a private forest reserve, bird sanctuary and archaeological site in the Cayo District of western Belize.

Forest Domain Awareness System (FDAS)
Often technology is never used by the people who most need to use it, therefore the purpose of the project is to help rangers protect forests and wildlife more effectively and safely on the ground. Protected areas are vast expanses of land with threats of deforestation, illegal logging, community encroachment, poaching, climate change, and illegal trading of wildlife. It is vital for protected area managers to be able to monitor wildlife and their natural habitats in real-time.

SFN designed the Forest Domain Awareness System (FDAS) to bring together the latest space technology, terrestrial sensors, and ranger training to provide enhanced awareness and early warning for those responsible for protected areas. Central to FDAS is a rigorous training element that aims to empower protected area managers and ranger teams to utilise, operate and maintain the technology and its data to instantly impact decisions on the frontline of conservation.

Alerts from acoustic, seismic and photographic sensors are combined with deforestation alerts from satellites for a fully holistic monitoring tool to support forest rangers in the field. Forest protection efforts have

historically suffered from too few rangers guarding too much forest. Sadly, over 1000 forest rangers have been killed throughout the world defending protected areas from illegal logging and poaching. These activities have a devastating impact on the world's reserves and on the people, who live in and around them. It has contributed to conflicts, violence, human rights abuses, corruption, and worsening poverty, while having devastating environmental consequences, including river pollution, the loss of biodiversity and its habitat, and the emission of greenhouse gases.

FDAS is a game-changing tool that has the potential to become a 'force multiplier' that dramatically improves awareness of unauthorized human presence and activity in large swaths of forests. The Pook's Hill FDAS has only been operational for a little over a year which is effectively one logging season however it is already transforming the situational awareness, effectiveness, and safety of the Pook's forest ranger team. By introducing a data-driven enforcement strategy into the reserve, the Chief Ranger is utilising the system daily to direct patrols and inform operations. Following the proof of concept in Pook's Hill, there are plans to expand the system to Tapir Nature Reserve (a neighbouring reserve) with support from the Oak Foundation.

Across the project there have been many success stories; there is generally a high level of ownership of project activities and outputs, particularly where activities have focused on building on existing systems and expertise in the country, rather than starting from scratch.

There has been a levelling up of capacity to develop high quality thematic (land use) maps as a baseline to assess annual change, as well as the development of early warning systems in Colombia, Kenya and Indonesia. This has led to contributing to improved response to illegal forest activity, improving national Forest Reference Emission Levels (FRELs) and reporting of forest cover / loss, which has supported unlocking results-based payments for REDD+ and other agreements - approximately US$ 300 million in payments have been made to Forests 2020 partner countries through these agreements since the project started.

Beyond improved capacity and adoption by government agencies, there has been significant progress in adoption by downstream users, such as producer organisations and private sector companies that are increasingly required to demonstrate that commodities in their supply chain are sustainably sourced and compliant with zero-deforestation agreements. While the legal requirements in some producer countries like Brazil may have decreased due to political pressures, there is strong evidence of growing demand for zero-deforestation assurance services across various sectors and jurisdictions. Companies have signed up to Zero-Deforestation Agreements with the Government in Colombia for key commodities such as palm oil, soy, cocoa, beef and dairy, and as of August 2021, coffee. Discussions are ongoing with the Ministry of Environment and various industry players about how Forests 2020 outputs from IDEAM can be used with the Ecometrica Platform to support the monitoring of these agreements. Legislation within the UK Environment Bill and from the EU will soon require companies to ensure supply chains coming into the countries are not linked to illegal deforestation, and there will be growing demands from financial institutions for this information through initiatives such as the Task force for Nature related Financial Disclosure (TNFD). Providing monitoring tools as services for these users is a huge opportunity for Forests 2020 to maximise impact and one that Ecometrica will continue to offer.

Bringing Clarity.