

# ONE STEP AHEAD IN PREVENTING ILLEGAL DEFORESTATION

**FOREST  
FORESIGHT**

A WWF initiative





## Protecting our forests is vital, now more than ever.

That's why we developed Forest Foresight, an innovative AI-driven technology for preventing illegal deforestation.

Through the power of prediction, we enable local stakeholders to take action on the ground and intervene before actual forest damage occurs. Having proven successful already in Gabon and Kalimantan, we are now ready to scale. And to scale in line with our ambitions, we are actively seeking funders, alliance partners and governmental users of this technology.

Forest Foresight has been developed alongside BCG (Boston Consulting Group), Deloitte, AWS (Amazon Web Systems) and several academic institutions. We hope you'll join us too so that together, we can maximise the impact and conserve our world's forests.



# CONTENTS

# INNOVATING FOREST CONSERVATION

## Protecting our forests is vital, now more than ever

Forests are crucial for the health of our planet, and for our survival as human beings. They provide clean air, drinking water, food, medicines, a home to millions of animals and people, and are our key ally in the fight against climate change. Especially primary forests, which are some of the densest, most ecologically significant and carbon rich forests on Earth ([NCASI](#)). Yet almost half of the world's original forests have already disappeared and illegal deforestation and forest degradation have been accelerating at alarming rates in recent years. In 2021, primary forest areas equivalent to the size of Denmark were illegally cleared for the sole purpose of growing crops for food and animal feed ([Forest Trends](#)).

With deforestation being the second largest source of greenhouse gas emissions ([WWF](#)), it is urgent that we halt these illegal activities before it's too late. Our efforts to restore forests need to be augmented with actions preventing illegal, unsustainable deforestation and forest degradation of primary forests. Such actions will deliver immediate climate benefits, protect wildlife and defend the rights of indigenous peoples. Because primary forests cannot simply be replanted. Once gone, they're gone forever.

## Introducing a state-of-the-art solution to the global problem of illegal deforestation

When we can predict the future, we can minimise harm. This is true as well for forests. And as of now, **a truly unique tool is available that uses predictive capabilities to halt illegal deforestation before it even begins.** Forest Foresight is a highly-sophisticated, yet simple-to-use online tool that combines geo data with radar based satellite imagery to predict changes in the landscapes. Certain patterns of changes, once detected, enable (local) stakeholders to intervene in time to prevent deforestation – before irreversible damage is done.

To halt climate change and biodiversity loss, a global effort is required. Fortunately, governments, businesses and local communities are joining forces and taking action. Several tools and platforms that monitor activity levels of deforestation are already operating effectively, internationally. Their limitations however, are that they can only detect deforestation that has already occurred – after it's too late. By adding the power of prediction, Forest Foresight can support and empower such systems already embedded with local stakeholders and produce greater impact.



More than 1.6 billion people depend on forests directly for their livelihoods, and many more rely on forests for their food, water and clean air ([WWF](#), [UN environment programme](#) & [United Nations](#)).



Forest degradation and destruction account for up to 20% of global carbon emissions – more than that of the entire global transport sector ([Environmental Defence Fund](#)).

Forests are home to 80% of land-based wildlife, housing incredibly complex and unique ecosystems ([WWF](#)).



Every minute  
we lose

30

football  
fields of forest

(WWF)



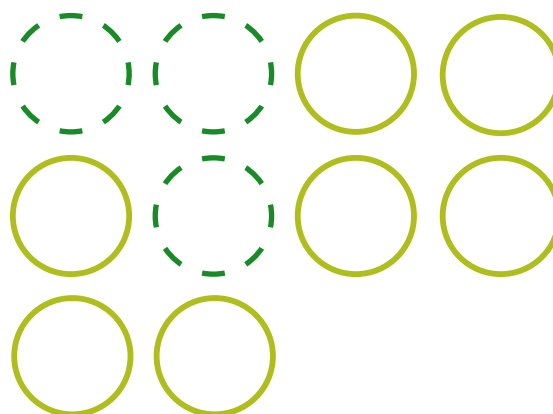
# UNLOCK THE POWER OF PREDICTION

## Transform data into action with Forest Foresight

Forest Foresight combines artificial intelligence with the power of data-driven modelling capabilities to predict forest loss up to six months in advance, **with 80% accuracy**. Automated alerts enable stakeholders to investigate at a local level and intervene as necessary – thereby transforming data into action.

Initially entitled 'Early Warning System', Forest Foresight has been developed alongside BCG (Boston Consulting Group), Deloitte, AWS (Amazon Web Systems) and several academic institutions. By connecting this powerful global network to locally established WWF offices, Forest Foresight's timely alerts turn data into action, enabling full local ownership. Examples include supporting law enforcement, engaging communities, and supporting stakeholders with changes in policies, such as environmental and social safeguards.

By using Forest Foresight, it is our mission to help reduce illegal deforestation in tropical forests by 30%



## The unique way Forest Foresight works



Collect historic satellite images (Radar, Sentinel 1), analyse and label changes in forest cover



Collect additional datasets that could predict forest loss, such as topological data and population density



Based on all collected data an **advanced machine learning model studies** how forest loss occurred in the past



The **machine learning model concludes** that for example forests close to new roads or increased human activity are at risk



The forest risk maps can now be connected to **concrete interventions to prevent illegal deforestation**



## Forest Foresight in practice (as piloted in Gabon & Kalimantan)



Somewhere within millions of hectares of primary rainforests...



Photo: © Greg Armfield / WWF-UK

...satellite images have detected what look like the beginnings of a new logging road.



Screenshot from video 'Implementation of the EWS in Gabon'

A Ministry of Environment employee spots this landscape change, and forwards an alert.



Screenshot from video 'Implementation of the EWS in Gabon'

Forest rangers on the ground are notified that an illegal road is being constructed.



Photo: © Tessel in 't Veld / WWF-Netherlands

They head out to the location and use their drones to verify whether this activity is really taking place.



Screenshot from video 'Implementation of the EWS in Gabon'

Once verified the rangers act to prevent further illegal logging and now include this high risk area in their patrols.



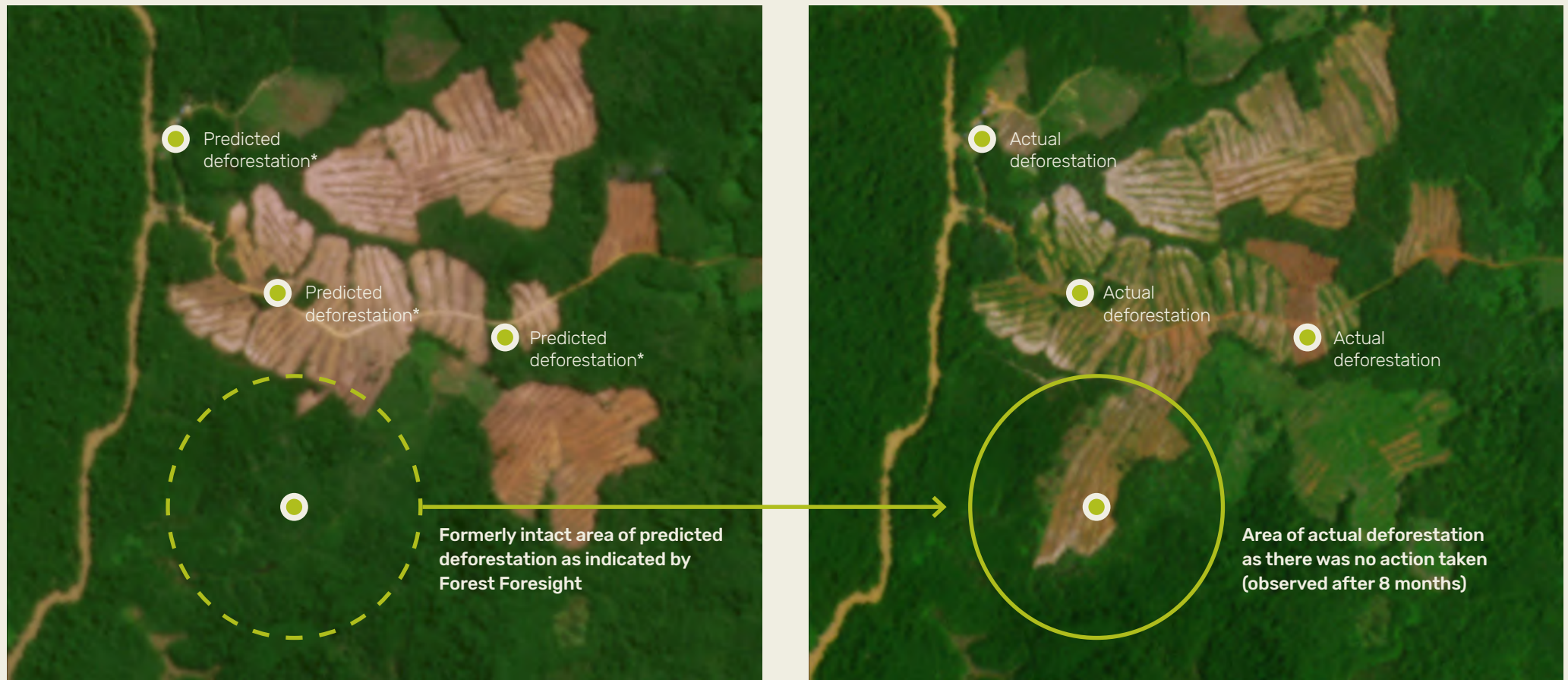
“WE HAVE A LOT OF MODELS  
OR APPLICATIONS ALREADY.  
BUT ONE THAT CAN PREDICT  
AND PROVIDE AN EARLY  
WARNING, ESPECIALLY USING  
ARTIFICIAL INTELLIGENCE,  
IS VERY RARE.”

Ministry of Spatial Planning,  
Indonesia (Forest Foresight)



## How the prediction model corresponds with actual deforestation

These images show an example of a prediction that was made by our Forest Foresight program, which unfortunately came true. The image on the right shows that deforestation has taken place.



**Before** - June 2021 Central Kalimantan (Indonesia)

**After** - February 2022 Central Kalimantan (Indonesia)

\* for illustrative purposes this is a simplification of predicted hotzone representation

## Tap into the benefits to create a bigger impact together

Forest Foresight is available for all stakeholders who have an interest in, or a mandate to, halt or manage illegal deforestation. Our mission is to augment the ways in which stakeholders receive their information about deforestation. With its predictive capabilities, Forest Foresight can help to improve forest management at a local level and increase the effectiveness of interventions to prevent illegal deforestation.

To ensure successful scaling, WWF-NL is now actively seeking funders, collaborating partners and government entities who would like to implement the tool in their country or region.

**TOGETHER, WE CAN MAXIMISE  
THE IMPACT OF CONSERVING  
OUR WORLD'S FORESTS.**





## Why contribute funding to Forest Foresight?

Global awareness is increasing that we must conserve nature in order to halt or even reverse anthropogenic climate change and biodiversity loss. Tropical forests alone can provide 23% of the cost-effective climate mitigation needed before 2030, as set in the Paris Agreement ([UNFCCC](#)) and underlined in the Glasgow Financial alliance for Net Zero ([UNFCCC](#)). Yet these same forests currently account for less than 3% of climate mitigation funding ([MRI](#)). Investments in conservation need to increase exponentially, if forests are to help us all meet the ambitious goals set in both the Paris Agreement and the 2030 Agenda for Sustainable Development ([United Nations](#)).

## What's in it for you as a philanthropist or donor government?

- **Commit to the Nature Positive Movement**  
Strengthen your network and deepen relations with governmental leaders, businesses, financial institutions, NGOs and civil organisations who are similarly determined to halt and reverse forest and biodiversity loss, by stopping illegal deforestation ([COP26](#), [United Nations](#), [Consilium Europa](#)).
- **Co-create a healthier, more sustainable future**  
Address climate change and enhance the resilience of our planet by helping to protect, conserve and restore biodiversity. Help indigenous peoples, local communities, and the global economy by participating in, and supporting sustainable supply chains as well as preventing emerging pandemics related to biodiversity loss.
- **Support global efforts to conserve natural assets**  
Join our efforts to maintain and protect our wilderness treasures before they disappear forever. Because now, with the power of prediction, we can intervene in time to halt losses caused by illegal deforestation.



Photo: © Marizilda Cruppe / WWF-UK





## Why contribute funding to Forest Foresight?

Global awareness is increasing that we must conserve nature in order to halt or even reverse anthropogenic climate change and biodiversity loss. Tropical forests alone can provide 23% of the cost-effective climate mitigation needed before 2030, as set in the Paris Agreement ([UNFCCC](#)) and underlined in the Glasgow Financial Alliance for Net Zero ([UNFCCC](#)). Yet these same forests currently account for less than 3% of climate mitigation funding ([MRI](#)). Investments in conservation need to increase exponentially, if forests are to help us all meet the ambitious goals set in both the Paris Agreement and the 2030 Agenda for Sustainable Development ([United Nations](#)).

## What's in it for you as a successful global business?

- **Anticipate changes in ESG requirements**  
Proactively comply with increasing legal and financial ESG legislations, and mitigate illegal deforestation-associated risks within your supply chain(s), ecosystem or portfolio – thereby increasing your business resilience ([European Parliament](#), [World Economic Forum](#), [WWF](#)).
- **Show your active participation**  
Demonstrate to your customers, corporate stakeholders and partners that you are participating in the global transition to sustainable practices. And become a front runner in maintaining a transparent and traceable supply chain, ecosystem or portfolio ([WWF](#)).
- **Seize new opportunities for business growth**  
Forest conservation is increasingly being recognised for its many opportunities to gain economic benefit ([Deloitte](#), [World Economic Forum](#), [WWF](#)). Join the nature-positive economy and leverage opportunities for increased profitability and growth coming from sustainable business practices and emerging funding mechanisms, such as those connected to carbon credit models.



Photo: © Andre Dib





## Why collaborate with Forest Foresight?

WWF has offices around the world and is connected to a wide network of stakeholders with expertise regarding local opportunities and challenges. By leveraging aspects of these local and global partnerships, we can be productive across entire chains of collaborations, ensuring successful implementations of Forest Foresight.

By partnering with WWF on Forest Foresight, you have an opportunity to help grow and scale this uniquely innovative tool by taking ownership over aspects of our operations such as the technology, implementation support or required capabilities and capacity.

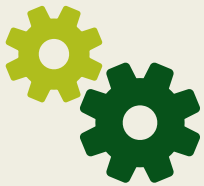
## What's in it for you as a potential alliance partner?

- **Scale the impact, together**  
Bring the best of your experience, capabilities, and capacities to complement, and benefit from, the skills and knowledge of the wide range of WWF and implementation partners involved in Forest Foresight.
- **Demonstrate your commitment**  
Support projects in line with your societal and environmental values. Enhance your brand profile towards your customers and stakeholders, and attract new talent through active involvement in forest and environmental conservation.
- **See your contribution bring about positive change**  
Work with cutting edge technology as it is applied in the field, making real and measurable social and environmental impacts around the world.



Photo: © Luis Barreto / WWF-UK





## Why start using Forest Foresight?

The exact causes of deforestation change over time and vary from region to region. These regional differences highlight the need for place-based solutions that take specific local contexts into account. Forest Foresight complements your various digital monitoring tools and datasets that are already operational, and is there to support you through a user-friendly, customisable dashboard. And to help maximise your impact, **we offer additional bundles of support and services**, as needed. Examples include capacity building, advocacy training and best practice intervention training, in partnership with forest conservation coalitions.

\*National Forest Monitoring Systems

## What's in it for you as a potential user?

- **Integrate with an NFMS\* and access new funding opportunities**  
Forest Foresight-generated alerts and results enable you to prove to what extent you're sustainably monitoring and protecting forests; and thereby addressing climate change and biodiversity loss. This in turn can create new pathways to receiving funding for climate change mitigation, carbon offsetting and forest and biodiversity conservation – for example through a Jurisdictional REDD+ construction.
- **Help reach COP26 goals and protect your country's natural assets**  
Through use of the predictive features, you can intervene earlier than with any other solution on the market, and act on illegal deforestation before damage occurs. In this way, you will be actively contributing to COP26 goals by protecting both your wilderness areas, and all the people, animals and economic activities that depend on those forests ([United Nations](#), [World Resource Institute](#)).
- **Benefit from seamless integration**  
Customised to your local needs, Forest Foresight aims to integrate seamlessly into your existing processes and systems that are already in use to combat illegal deforestation. And when needed, WWF and its partners will provide additional support to ensure you can take the required action on the ground.



Photo: © Marizilda Cruppe / WWF-UK



## Building on our success so far

To date, by using the Forest Foresight tool, WWF is proud to have already successfully predicted deforestation and averted illegal deforestation across a variety of different landscapes in Kalimantan and Gabon, with more countries still in the pipeline. Working in close collaboration with governments and local communities, the groundwork has now been laid for the ongoing conservation of primary tropical rain forests.

In Gabon, rangers visited specific sites, confirming that predictions had come true. Targeted interventions allowed them to uncover illegal gold mining activities in time to save an estimated 30 hectares from illegal deforestation, thereby preserving rainforest that would otherwise have perished.

Other predictions shed light on logging road constructions that exceeded the legal dimensions. And in a third area, predictions led authorities to co-develop a new land use plan with a local community, to help guide the establishment of a community garden, to provide a sustainable source of income for the local people.



**by using the Forest Foresight tool, WWF is proud to have already successfully predicted deforestation and averted illegal deforestation across a variety of different landscapes in Kalimantan and Gabon, with more countries still in the pipeline.**





# ACCELERATE IMPACT BY SCALING NOW

## Taking the next steps to reach our full potential

Forest Foresight has been tried, tested and proven, and is now ready to scale. Alongside international collaborators, funders and local partners, Forest Foresight plans to roll out operations across 15 landscapes in 12 countries over the coming 5 years – effectively protecting a total of **815 million hectares** of primary forest from illegal deforestation.

Since every million hectares of forest saved from deforestation is equivalent to keeping 10 million metric tons of CO2 out of the air, this equates to protecting forests with a carbon value equivalent of over 1.4 billion cars per year ([USAID](#)).

“FOREST FORESIGHT PROVED  
TO BE EFFECTIVE, **NOW WE  
NEED MORE SUPPORT TO  
HOST PART OF THE SYSTEM**”

Gabonese Agency for Space Studies  
and Observations



# Our high-level roadmap

Our high-level roadmap highlights the next 18 months' key milestones that will enable us to achieve our ambitions.



## Achieved



## Foundation



## Build



## Grow

<b>Secure funding to drive our roadmap</b>	<b>Prioritised</b> business models and cost projections for scaling roadmap	<b>Secure</b> initial funding commitments from corporate and philanthropic payers	<b>Test</b> prioritised business models with payers	<b>Design</b> MVP to implement business models with pilot payer groups
<b>Assess pilot landscapes &amp; countries</b>	<b>Completed</b> pilots in three countries, expanding in two	<b>Validate</b> enabling conditions with relevant officials for upcoming landscapes	<b>Finalise</b> scope of targeted landscapes at full scale	<b>Complete</b> stakeholder map and comms plan for governments of remaining landscapes
<b>Manage partnerships &amp; the program</b>	<b>Secured</b> technology and implementation partners	<b>Set-up</b> approach and governance for fundraising partnerships	<b>Set-up</b> approach and governance for capability partnerships	<b>Secure</b> partner commitments for local government support
<b>Build capabilities within targeted landscapes</b>	<b>Defined</b> services and support required to implement in upcoming landscapes	<b>Engage</b> partners for local data and analytics support	<b>Design</b> data and analytics trainings with partners	<b>Implement</b> newly developed trainings for data and analytics in landscapes
<b>Develop &amp; maintain Forest Foresight</b>	<b>Built and trained</b> the prediction model	<b>Confirm</b> data providers and datasets for upcoming landscapes	<b>Re-train</b> and validate models with data for upcoming landscapes	<b>Develop</b> landscape-customisable PaaS approach*

## Looking ahead to financial sustainability

To financially sustain the tool and its operations and ensure we can reach our milestones, our initial growth depends on traditional funding models: donations and grants from philanthropists, governments and corporations. In order to make Forest Foresight financially sustainable, we will increasingly need to leverage business models, together with our partners.

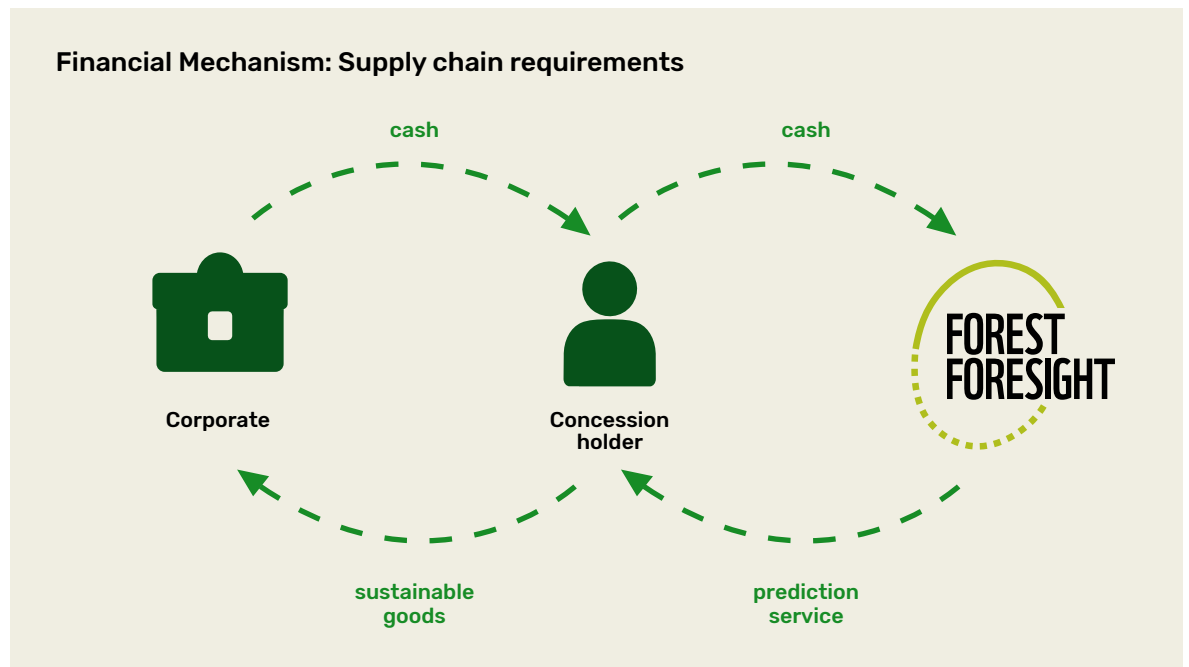
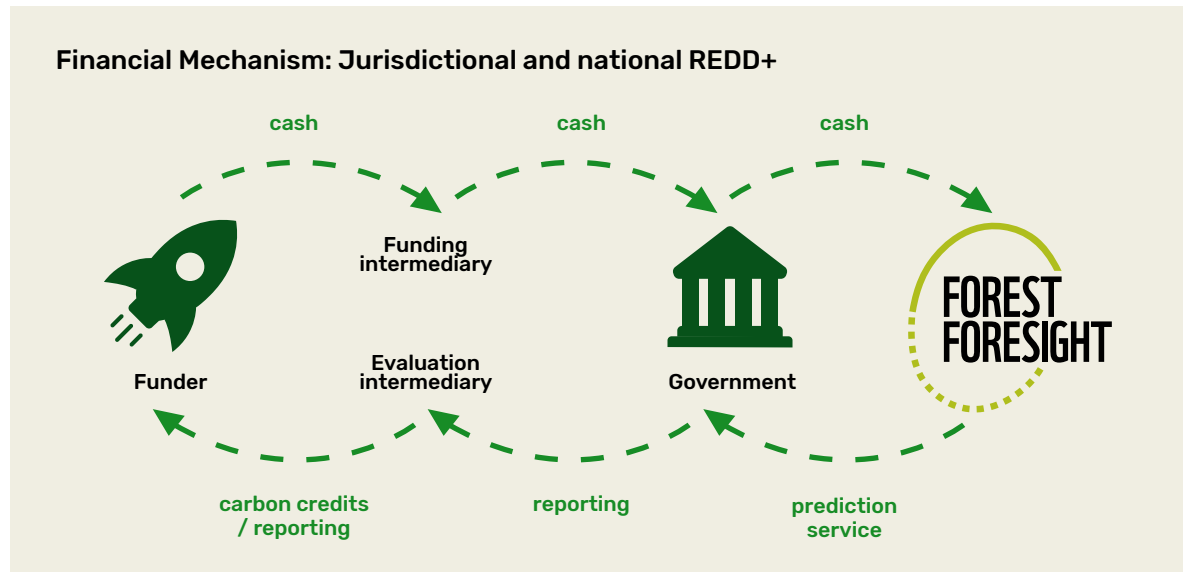
We have identified the financial mechanisms of jurisdictional REDD+, and supply chain requirements, as the best fits for Forest Foresight and the stakeholders involved. Additionally, we could consider the option of direct transactions with end users or third-party service providers.

### Financial Mechanism: Jurisdictional and national REDD+

Using Forest Foresight integrated with a National Forest Monitoring System (NFMS) in a REDD+ incentive mechanism enables governments to verify and report on their commitment to reduce carbon emission by monitoring and preventing land use change such as (illegal) deforestation, so they can receive results-based payments. All while engaging with indigenous and local communities throughout the process.

### Financial Mechanism: Supply chain requirements

Using Forest Foresight in a supply chain construction enables concession holders to gain revenue from corporates with supply chain requirements. Alternatively, corporates can choose to pay for Forest Foresight to assess those same supply chains.



# JOIN US & ACT TODAY

It's taken a global network of passionate, committed individuals and organisations to bring Forest Foresight to where it is today. The results so far are promising and we're proud of what we've achieved – yet our ambitions remain high, and the next steps are crucial. Because **THIS** is the time to really make a difference and maximise impact, on a global scale. By joining us in our mission, you will become part of a worldwide solution.

We are actively seeking funders and alliance partners to help us scale to the next level. And we're open to offers and enquiries from potential end users wanting to get involved with predicting and preventing illegal deforestation. So that together, we can take the next step in forest conservation.

Please contact the Forest Foresight team at: [ff@wwf.nl](mailto:ff@wwf.nl).  
We look forward to hearing from you.



Photo: © Daniel Martínez / WWF-Peru





# FOREST FORESIGHT

A WWF initiative

© WWF 2022

