Coordinated and collaborative application of the mitigation hierarchy in complex multi-use landscapes in Africa

A conceptual framework integrating socioecological considerations

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FAUNA & FLORA INTERNATIONAL

Report prepared by Fauna & Flora International

Cover photographs: Jeremy Holden/FFI (main image), Juan Pablo Moreiras/FFI (top and bottom right), Curioso.Photography/ Shutterstock.com (middle right)

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Citation: Fauna & Flora International (FFI). 2021. *Coordinated and collaborative application of the mitigation hierarchy in complex multi-use landscapes in Africa. A conceptual framework integrating socioecological considerations.* FFI: Cambridge U.K. Available from: www.fauna-flora.org

Acknowledgements
Thanks are extended to the Arcus Foundation for their support, funding and for the extensive body of work consolidated in the State of the Apes publications that has enabled the development of this report. Special thanks for the wealth of specialist inputs from across FFI's regional, cross-cutting and Guinea programme teams including from Hattie Branson, Abass Camara, Laura Fox, Sam Gregory, Twyla Holland, Dr Martin Kaonga, Dr Kathryn Phillips, Emma Scott, Jonas Siba Dopavogui, Dr Rob Small, Dr Angelique Todd, Koighae Toupou and Samir Whitaker.

The project Advisory Group's proactive engagement has been invaluable in the development and improvement of the conceptual framework. We thank Jennifer Abuah (Olam), Dr Louise Buck (EcoAgriculture Partners/ Cornell University), Dr Penda Diallo (Camborne School of Mines, University of Exeter), Dr Amrei von Hase (independent biodiversity specialist), Dr Lesley Mitchell (Forum for the Future) and Dr Jo Treweek (Treweek Environmental Consultants Ltd). We thank others who have shared their experience, insight, learning and data that has shaped thoughts and direction along the way. This includes the team leading the COnservation, impact Mitigation and Biodiversity Offsets in Africa (COMBO) Project – Dr Hugo Rainey, Catherine André-Munch, Dr Fabien Quétier and Dr Amrei von Hase; Dr Rebecca Kormos (the IUCN Task Force on Avoidance, Reduction, Restoration and Compensation of negative impacts from Energy, Extractive and Associated Infrastructure Projects on Ape (ARRC)); and Jon White and David Lyon (ImpactAgri). We acknowledge the enormous value of open source datasets and the databases that have been created and maintained as a repository for data, such as the IUCN Species Survival Commission Ape Populations, Environments and Surveys (A.P.E.S.). We thank the individuals and organisations that make their data available for application and that manage the databases that help to improve access to available data.

Foreword

A framework for nature – applying the mitigation hierarchy in complex, multi-use landscapes.

As we look at the impact of our actions on the planet's ecological and atmospheric stability, we can see there is something seriously wrong with the fundamental premises of decision-making, and how our economies and societies operate. Nature is all but absent as a critical factor in decision-making. While Covid-19 is deadly and destructive, we are deeply in the throes of three planetary crises. The three crises - the climate crisis, the nature crisis, and the pollution and waste crisis - have been underway for decades, caused by unsustainable consumption and production. The crises are evident in rising temperatures, wildfires, droughts, floods, hurricanes and species loss.

What needs to change to respond to our failures to deliver on the Sustainable Development Goals and to centralise nature in our decision-making?

We are all, in some way, responsible for environmental degradation and destruction, just some of us are further from the footprint than others. We do not make the connection through the supply chains of either our food or our consumption habits to environmental and social impacts from where raw materials are sourced. Governments need to set, implement and apply the rules, and companies cannot do business at any cost. Yet we must also acknowledge that the greatest impacts often come through the effects of economic development on other human activities.

In response to increasing pressure by investors and other stakeholders, large-scale mining, fossil fuel and large-scale agribusiness companies are improving commitments and reporting on environmental, social and governance performance, but there is still a long way to go. Furthermore, there remains a significant disjuncture between public commitments at the top and tangible actions on the ground (Responsible Mining Foundation, 2020). Many impacts, such as indirect impacts on land use, forest loss and degradation, do not feature in many company climate policies or emissions reporting and those that do are often approached in an isolated, siloed manner. The World Bank's Forest-Smart Mining report (Maddox et al., 2019), for example, found that in a forest mining landscape 90% of impacts to forests were because the mine is there, not because the mine has a big footprint. The people drawn to the mine, and in turn to the forests, need land, food and other natural resources generating by far the greatest impacts. Companies and government decision-making institutions need to be accountable for these impacts.

Environmental (and Social) Impact Assessments (EIA/ ESIAs) remain the primary tool for understanding and addressing environmental impacts, but they remain project based, limited in scope and highly varied in their quality and application. The practical application of ESIA processes and strategic land use planning tools are important if and when applied well, however both process and

impact assessment are often grossly inadequate in the way they tackle complexity at a landscape or stakeholder scale. They frequently fail to effectively consider biodiversity and ecosystem services and to centre nature in decision-making. They focus on risk rather than impact assessment. They conflate risk to companies and lenders with impact assessment, rather than risks or impacts to the environmental and social receptors.

"The ability of countries and communities to achieve sustainable development depends in no small measure on robust and effective EIA/SEA legislation and implementation as a major catalyst for overcoming current implementation gaps and achieving better environmental outcomes"

(UN Environment, 2018).

This brings the need for broad uptake of clear objectives-led frameworks, such as net positive impact[1] and the use of the mitigation hierarchy to avoid, minimise and restore impacts and to compensate for damages. All players in a landscape can drive or draw responsible environmental stewardship through incentives, nature-based solutions, carbon and biodiversity offsets, collaboration and partnership with different stakeholders in a landscape. Herein lies the need for cross-sectoral co-operation between corporate and government agency and the governance of their actions in a landscape. The need for an integrated approach to the delivery of the Sustainable Development Goals and a post 2020 agenda that is inclusive and driven by what communities want and need but with intact, healthy, functioning nature, at the heart of it all. Nature-based solutions would be the delivery mechanisms that draw the co-benefits into the positive environmental and societal change.

Better understanding of ecological baselines will help us avoid harmful impacts and better manage them before resources are used unsustainably. As such, we have to understand thresholds to ensure resilience (to climate change and use), ecosystem function (for services provided by nature, particularly water and climate mitigation) and sustainability.

There is an urgent and growing call for coordinated, collaborative and collective action. Much of this call is about voice, power, influence and the need for collaborative action. More importantly, though, it is perhaps about recognising the complexity and breaking down the hierarchies of responsibility so that all stakeholders become accountable or are enabled to become part of the solution. Companies need strong rules that are consistently enforced, people do, too. Companies must do right by society, governments need to make sure they hold them to account and citizens must be empowered and supported to do so too.

How can we build landscape level resilience in ecosystems that are inclusive? How do we effectively acknowledge the deep complexity in a landscape and effectively respond through inclusive collaboration with all the players?

The nature-centred framework presented in this document provides a pathway to contextualise our activities in the complexity of the landscapes in which we operate and to help mobilise action and collaboration on the ground. It promotes applying the mitigation hierarchy to achieve positive outcomes for biodiversity and ecosystem services in multi-use landscapes that are peppered with conflicting, competing, collaborating activities from commercial to community to individual scale - all of which have potential for significant impacts if unmitigated.

1. Net positive impact is achieved when the impacts on biodiversity caused by an activity are outweighed by the actions taken in accordance with the mitigation hierarchy (avoidance, minimisation and restoration of impacts and compensation where residual impacts remain) to achieve an overall, socially equitable, net gain for biodiversity.

Applying the mitigation hierarchy in complex multi-use landscapes in Africa

The key is to consider the complexity of multi-use landscapes. As project proponents and stakeholders, we need to seek opportunities in the landscape for potential avoidance (protection), restoration and compensation whilst trying to satisfy socio-economic necessities and objectives. What is recognised in this framework is that all users in a landscape have impacts but that the size of these impacts is determined by the leadership of individuals, the collaboration and interaction of stakeholders, and how the governance active in the landscape and at a national level enables positive socioecological outcomes. Impacts are not limited to those subject to ESIA and even small-scale activities can have effects that aggregate in the landscape – so all actors need to be involved to mitigate their impacts in the context of other impacts and some actors will need to be enabled and supported, whilst others will need strong regulation that is applied and enforced consistently.

Complex socioecological landscapes are difficult to manage in the absence of basic provision of human rights and needs, community structure, land tenure, accountability, governance and frameworks that enable delivery of best practices from the extractive/ agriculture/ infrastructure sectors but also the other users that come into the landscape on the back of the roads and servitudes. Pointing fingers at companies only is not going to solve the problem; it often comes down to the architects and funders of the projects in the first place.

Through the application of the framework there needs to be space and opportunity for citizens to have voice, to be part of the solution, and to hold all actors in the landscape to account. To do this, we need to understand the role of each actor and their impacts on biodiversity and ecosystems.

"Imagine a world in which projects can only raise capital when they have demonstrated that they will contribute meaningfully and positively to restoring the planet's bounty and a safe climate for all?"

Professor Kai Chan, University of British Columbia (Dunbhy, 2020)

The framework offers entry points to better tackle the complexity of landscapes, providing an approach that enables manageable elements, many of which will be familiar. This report outlines a framework which refocuses decision-making on biodiversity, ecosystem services and community and envisions **a sustainable future where development takes place within the bounds of nature.**

Pippa Howard
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Fauna & Flora International

Collaborating Across the Landscape to Mitigate impacts of development (CALM)

The CALM framework at a glance

The framework presented in this document puts nature firmly at the centre of land use and development planning, recognising the fundamental role that healthy, resilient ecosystems play in human health, well-being and sustainable development.

The challenge

Across sub-Saharan Africa, projections for growth in energy, infrastructure, extractives and agriculture are staggering. Unmitigated impacts are driving the rapid decline of biodiversity with disastrous effects for carbon emissions, water security, human health and the lands and livelihoods of communities dependent on natural resources. Reconciling economic development, social and environmental objectives presents an enormous challenge. With urgent, concerted and collaborative efforts, there is still time to halt biodiversity loss and reverse the trend of nature's decline while meeting other societal goals.

Why this framework?

It responds to shortcomings in business as usual management of complex multi-use landscapes and a recognised need for transformative change in order that landscapes are resilient, development is sustainable and social and ecological values survive and thrive.

What is the framework?

It is a framework that brings a socioecological lens to land use and mitigation planning and promotes an inclusive and integrated landscape approach to the avoidance, mitigation and management of adverse impacts from development that engages with all sectors and scales of activity.

Delivery of the framework requires multi-stakeholder engagement and seeks to promote cross-sectoral and collaborative uptake and application of the mitigation hierarchy to achieve local and landscape objectives. It brings actors together into a collaborative frame with a common objective and draws on and encourages the use of existing frameworks, guidance, methods and tools in a complementary way to enable implementation. It is an iterative process involving a preparatory phase followed by four main steps:

STEP 1 Assess and understand the socioecological landscape, identify conservation and restoration priorities and define limits to impacts and mitigation

STEP 2 Assess and understand threats and pressures in the landscape

STEP 3 Multi-scale impact assessment and mitigation planning (project and landscape levels)

STEP 4 Applying the mitigation hierarchy across the landscape: a coordinated and collaborative approach to mitigate impacts and contribute towards landscape objectives

Applying the mitigation hierarchy in complex multi-use landscapes in Africa

Where is it relevant?

Complex multi-use landscapes where species, ecosystems and the communities that depend on them are under pressure from the individual and cumulative effects of concurrent developments.

Scale?

Landscape scale, with multi-scale impact assessment and mitigation in which project level contributions are nested within the wider landscape level.

Who should use it and why?

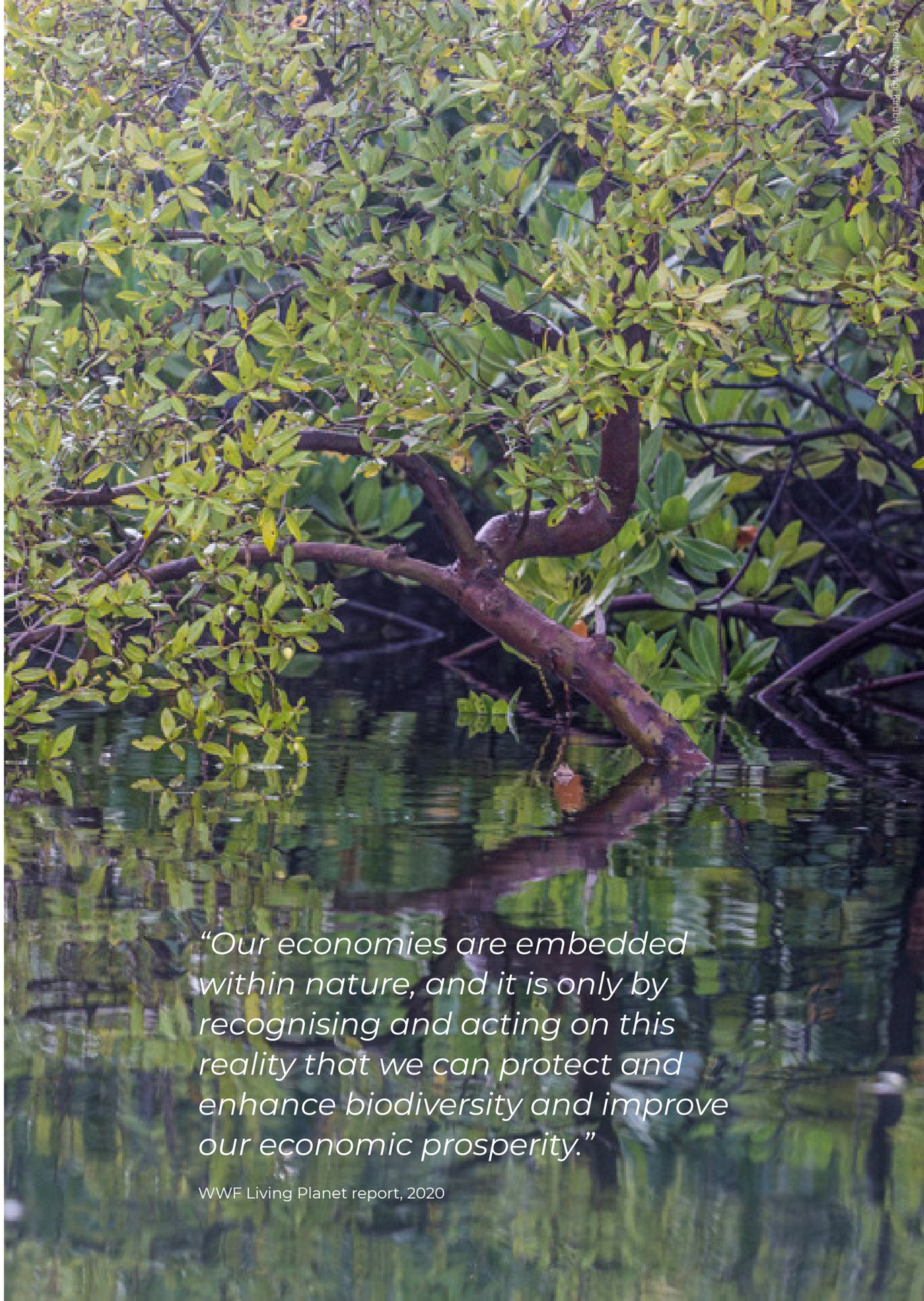
- **National and sub-national government agencies:** a decision support tool that integrates landscape level socioecological issues and mitigation hierarchy application in land use planning, permitting and development processes. Benefits:
  - Contribute towards national commitments
  - Support progress towards more sustainable landscapes
  - Prevent costly and irreparable damage to species and ecosystems
  - Support efficient, more effective implementation of regulatory requirements
  - Deliver multiple benefits, including social, ecological and economic.
- **Industry operators:** a process that enables the contextualisation of a new project or project-related impacts in the landscape, providing a view beyond the fence. Draws attention to a project's contribution to cumulative impacts and the opportunity and need for coordinated and collaborative mitigation and conservation action to manage risks, fulfil respective mitigation commitments and to contribute towards landscape objectives. Benefits:
  - Improve outcomes for biodiversity through mitigation at the project level
  - Support fulfilment of compliance requirements and voluntary commitments
  - Prevent costly and irreparable damage to species and ecosystems
  - mprove identification and management of shared risks
  - Improve relations with other land users.
- **Other actors** that use or influence the landscape can play important roles in catalysing, enabling and supporting the application of the framework (e.g. helping to build the information base on which decisions are made, facilitating multi-stakeholder, collaborative processes and brokering landscape partnerships).

Changing outcomes for nature: A new business as usual
Framing decision-making within the bounds of nature

Note: Scenario trajectories are illustrative and show relative relationships and are not intended to reflect actual or modelled data. Trajectories only refer to biodiversity.

Image adapted from SDG Knowledge Hub based on a paper by Leclère, D., et al. 2020 in Nature.

1 **A new business as usual scenario:** Integrated planning of development and limits to impacts and mitigation defined and respected, protection of ecological and socioecological values in the landscape, all industry actors apply mitigation hierarchy, sustainable land management, transparent and inclusive engagement with stakeholders, and cross-sectoral collaboration towards landscape objectives.	**OUTCOME: Opportunities created for the protection and enhancement of prioritised biodiversity and ecosystem services, ecosystem restoration, healthy functioning ecosystems, rich and functional climate resilient landscapes, thriving communities, multi-stakeholder partnerships.**
2 **Business as usual scenario:** Impact assessment and mitigation by some sectors, companies and projects; project-by-project decision-making andvariable oversight and enforcement by regulators; ad hoc sector specific standards and schemes driving improved practice at farm, project or supply chain level.	**OUTCOME: Biodiversity continues to decline affecting ecosystem function and health, and ecosystem services supply and flow across the landscape.**
3 **Worst case scenario:** Rampant development with unidentified and unmitigated impacts for species, ecosystems and people; unsustainable use of land and natural resources; climate change effects; inadequate consideration of the role of nature in the landscape; conflict and competition between land users and sectors.	**OUTCOME: Ongoing, rapid biodiversity loss and risk of ecosystem collapse with implications for carbon emissions, water security, health and livelihoods.**



"Our economies are embedded within nature, and it is only by recognising and acting on this reality that we can protect and enhance biodiversity and improve our economic prosperity."

WWF Living Planet report, 2020

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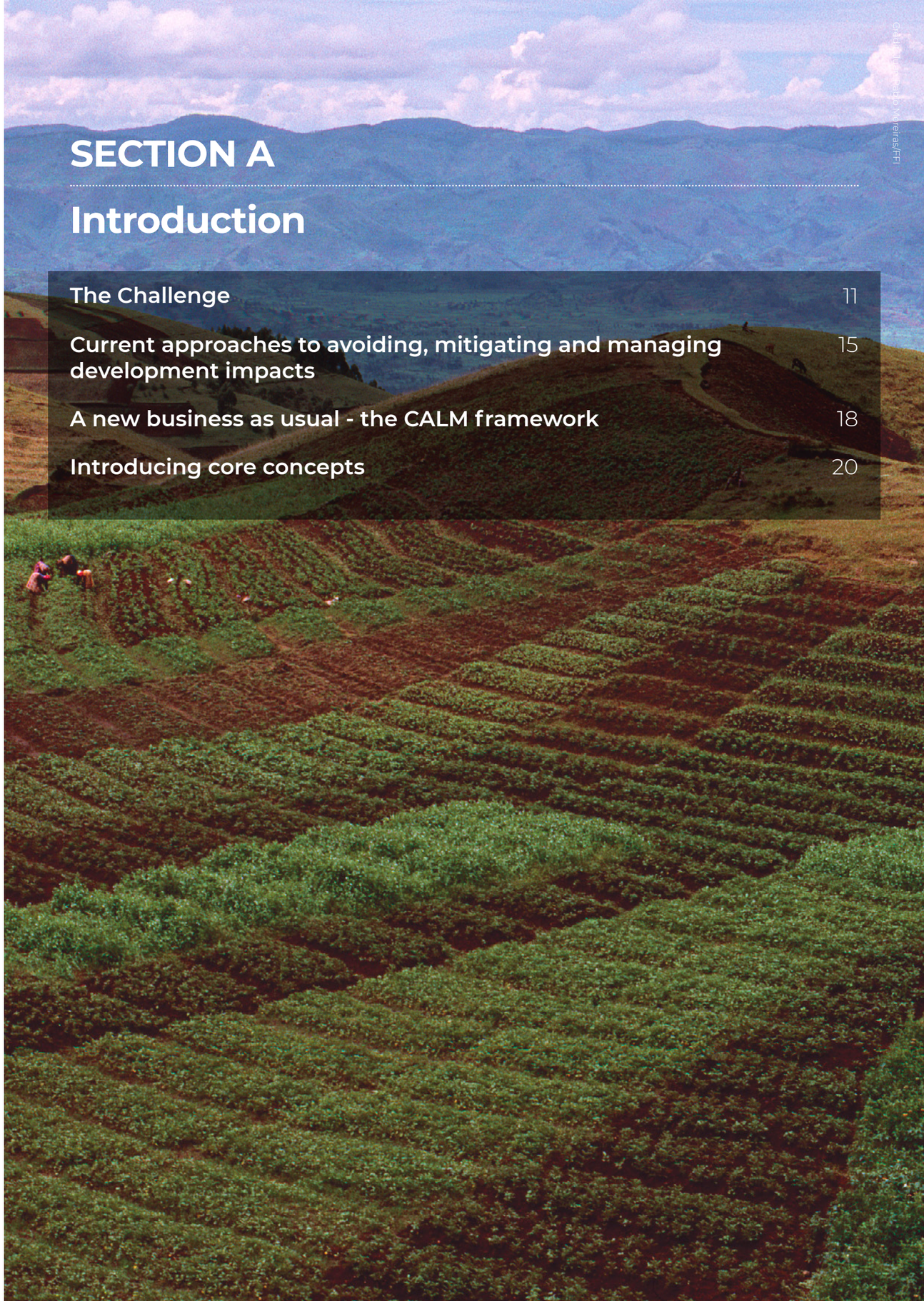

SECTION A

Introduction

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The Challenge

Across sub-Saharan Africa projections for growth in energy, infrastructure, extractives and agriculture are staggering. Planned infrastructure developments and their associated highways, rail links, power networks and pipelines, cut across vast swathes of the continent (see FFI 2021a). Many are designed to catalyse economic growth by improving access to resources, enhancing the flow of goods and people, supporting trade and economic integration and reducing production constraints. The scale of unregulated development and activities such as small-scale agriculture is also growing, driven by rapid human population growth. Rates of growth in West Africa are the highest in the world (Hurley et al., 2019).

No single sector, project or activity acts in isolation. Development projects take place in complex socioecological landscapes, alongside other development projects and activities, and in the context of other complex and inter-related challenges, including those relating to poverty, disease, rising inequality, conflict, climate change and ecosystem degradation. Together the many past, present and future decisions and actions that influence the landscape accumulate and interact.

Decisions and actions at all scales have an effect. Uncoordinated land allocation processes that lead to overlapping concessions and conflicts with existing objectives (Milder et al., 2014; Maddox et al., 2019). Transformative projects that induce growth in other sectors leading to significant large-scale and long-term consequences (e.g. for land conversion, carbon emissions and unsustainable wildlife exploitable), (e.g. Laurance & Arrea, 2017; Johnson et al., 2020). The incremental expansion of small-scale agriculture driving extensive deforestation (e.g. Appiah Takyi et al., 2019; Oxford Business Group, 2019). As each decision, project and activity cuts away a little more forest, adds pollutants to the rivers and soils, and extracts more natural resources than they put back, the cumulative effects on species, ecosystems and the people that depend on them are often significant. There is growing concern that this will lead to 'death by a thousand cuts' (Carrington, 2019).

The evidence is irrefutable: the scale of proposed and anticipated development is not compatible with viable, healthy ecosystems. The impacts of land use change and species overexploitation are driving the rapid decline of biodiversity with disastrous effects for carbon emissions, water security, human health and the lands and livelihoods of natural-resource dependent communities (WWF, 2020). Between 2010 and 2020, Africa had the highest annual rate of net forest loss in the world at 3.9 million hectares (ha) (FAO, 2020) and biodiversity on the continent declined by 65% between 1970 and 2016 (WWF, 2020). Land use change is the primary transmission pathway for emerging infectious diseases and the major driver of biodiversity loss in Africa (UNCCD, 2020; WWF, 2020). The dramatic population declines reported for some of the great apes in Africa (Box 1), is both an indicator and a stark warning of the intense pressures facing biodiversity and deterioration in ecosystem health.

There is growing risk that cumulative effects will reach critical 'tipping points'[2] where even modest changes radically change the structure and function of natural ecosystems and the dynamics of associated environmental, social, cultural and economic systems (Franks et al., 2010; Whitehead et al., 2017). Where impacts go unmitigated, multi-sector development will increasingly contribute to an irreversible legacy of degradation, pollution, extinctions, conflict and unsustainable trade-offs.

Reconciling economic development objectives with biodiversity conservation, climate mitigation, human health and water security presents an enormous challenge.

2. Also referred to as thresholds or system boundaries

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BOX 1: GREAT APES, OUR CLOSEST RELATIVES, IN PERIL

Today, all great ape species are categorised on the IUCN Red List as Endangered or Critically Endangered meaning they face a very high or extremely high risk of extinction in the wild. Grauer's gorilla has declined from an estimated 16,900 individuals to less than 4,000 in the last 20 years (Plumptre et al., 2016), whilst numbers of western chimpanzees dropped by 80% in 24 years, with the species already lost from three of the 11 countries where it ranged historically (Kühl et al., 2017). In 2016, the IUCN up-listed the western chimpanzee from Endangered to Critically Endangered, reflecting the dire status of the subspecies unless further declines are averted.

Worse yet, great apes rely on habitat that is increasingly targeted for development by extractive, productive, energy and infrastructure sectors (Arcus Foundation, 2014, 2015, 2018; Heinicke et al., 2019a; IUCN SSC Primate Specialist Group, 2020). Based on current trends, and with most of the subspecies' range unprotected, the decline of western chimpanzees will continue without immediate, drastic measures to curb threats to its survival (Kühl et al., 2017; IUCN SSC Primate Specialist Group, 2020).

Habitat loss and poaching are among the greatest threats to great ape conservation, with wild populations also at risk from the spread of human diseases (Arcus Foundation, 2014). As forest dependent species, the magnitude of negative impacts on apes is greatest in the case of clear felling as this results in the removal of most if not all trees. The construction of dams, roads and railways, mining activity, industrial logging and clearance for agriculture therefore pose significant threats for great apes in Africa (Arcus Foundation, 2014, 2015, 2018).

Although apes are impacted by many of the same threats as other taxa, they are especially vulnerable due to their socioecology (Arcus Foundation, 2014 and references therein): they are sensitive to human intrusion and disturbance, they nest and forage in trees, they take a long time to reach sexual maturity and have low birth rates, resulting in very slow population growth rates. Any disturbances that increase mortality rates even slightly, can quickly result in rapid population decline.

Great apes are comparatively well studied and are important flagship species for conservation. Their ranges overlap with many other threatened taxa, extend throughout many of the world's tropical forests, and they play important roles in ecosystem processes, providing benefits to people in the form of ecosystem services (e.g. through seed dispersal or sustainable wildlife tourism) as well as through their intrinsic and cultural value. Their severe decline is an indicator and a stark warning of the deterioration of ecosystem health overall. It is an urgent call to action.

Credit: Ivy Yin/Shutterstock

"Landscapes across Africa need to transform quickly to inclusive 'green' economies, if they are to meet the pressing challenges of employment generation, climate, food and water security and biodiversity conservation. ***The natural resource base must be used and managed carefully in alignment with economic activity to achieve a sustainable or even regenerative economy, while also sustaining nature. Thus individual businesses in the landscape that use or impact natural resources need to become landscape-friendly,*** *and available financial resources need to be redirected to businesses and other public, private and civic projects that support agreed landscape goals"*

African Landscapes Dialogue, 2020[3].

3. A coalition of 140 landscape leaders convened at the African Landscapes Dialogue, in Arusha, Tanzania in November 2019, and recommended a series of actions to advance sustainable landscapes in Africa, building on the Action Plans developed in 2014 and 2017. These are reflected in the resultant African Landscapes Action Plan – Phase 3.

Applying the mitigation hierarchy in complex multi-use landscapes in Africa

Current approaches to avoiding, mitigating and managing development impacts

Numerous methods and approaches exist to support land use planning and to identify, assess, plan for and manage environmental and social impacts in a landscape. Environmental (and Social) Impact Assessments (EIA/ESIA)[4] are the most known, used, and globally widespread tools for environmental planning and management whilst Strategic Environmental Assessments (SEA)[5] are the 'upstream' planning counterpart of ESIA (International Association for Impact Assessment, 2020). Many countries require an ESIA before projects are granted concessions or project loans. Alongside these, a range of performance standards, safeguards, and sectoral or supply chain initiatives have been developed to support good practice at the farm, project or production level.

Each approach is designed to deliver its own scope, scale and objectives and with varying degrees of uptake, application and enforcement (e.g. see UN Environment, 2018). For example, regulated impact assessment processes are not widely used for agriculture and are not applied at all for modification of land by smallholders; consequently, the process may not address a highly significant driver of environmental change in the landscape. In this case voluntary certification schemes may serve as the main driver of better practice with interventions targeted at the farm or production level but rarely addressing wider challenges in the landscape where production is taking place.

Each of the different approaches have their merits, yet because they are usually applied in isolation, collectively they have largely failed to adequately incorporate biodiversity and ecosystem services, or to deliver an integrated approach to identifying and managing risks and impacts in complex landscapes (Gillingham et al., 2016; World Business Council for Sustainable Development et al., 2017; UN Environment, 2018; Johnson et al., 2020; Bigard et al., 2020). Even when biodiversity is considered the complexity of ecosystem patterns and processes and species' behaviours and ecology seldom form part of an impact assessment or design of mitigation measures. This has undermined their application and therefore has contributed to the continued decline in species, loss of ecosystem health and integrity, in turn leading to a loss of livelihoods, increased poverty, heightened health risks and unmitigated development.

The indirect and cumulative effects of development projects have further stretched political systems geared toward the regulation and management of individual resource developments. Moreover, the tipping points of the limits of impacts are rarely acknowledged. The true extent of impacts over space and time are thus often overlooked and outcomes underestimated, in turn allowing impacts to go unmitigated and uncompensated for (Gillingham et al., 2016; Baird & Barney, 2017; Whitehead et al., 2017; Sonter et al., 2018). Project-by-project approaches rarely adequately consider the potential for cumulative effects, and there is recognition that in various contexts the ESIA process is simply not designed nor equipped to deal with the wide-ranging expectations placed upon it today (Gillingham et al., 2016).

Crucially, there remains a significant gap between mitigation plans and the delivery of tangible action and outcomes on the ground. Failure to avoid impacts in the first place and ineffective piecemeal mitigation efforts that are often applied too late result in irreversible impacts that are neither accounted for nor compensated. Poor financial and legal mechanisms for delivery of mitigation and challenges in securing the necessary funds and resources exacerbate the problem. Box 2 provides examples of recurrent issues with impact assessment and mitigation planning in the context of great ape landscapes.

4. EIA/ESIA is a formal, structured process to assess and predict potential adverse social and environmental impacts and to develop suitable mitigation measures, which are documented in an Environmental and Social Management Plan (ESMP). An ESIA is applicable for projects that have been identified by the Environmental and Social Management System (ESMS) screening as high or moderate risk projects, requiring full or a partial ESIA respectively.

5. SEA is a process and a tool for evaluating the effects of proposed policies, plans and programmes on natural resources, social, cultural and economic conditions and the institutional environment in which decisions are made. SEA might be applied to an entire sector (such as a national policy on energy for example) or to a geographical area (for example, in the context of a regional development scheme).

For industry operators, negligence or failure to manage risks relating to water, forests, primates and other unique and threatened species will have repercussions on project delivery: it can slow projects down, affect access to finance, cause conflict and controversy, cost money, and increasingly may stop projects altogether. As the world emerges from the 2020 pandemic, companies will be under increasing scrutiny to manage sustainability risks more effectively.

Evidence shows that with urgent, concerted and collaborative efforts for transformative change across economic, social, political and technological factors, there is still time to halt biodiversity loss and reverse the trend of nature's decline while meeting other global societal goals simultaneously (WWF, 2020). This requires rapid and improved use of existing tools, and innovative new initiatives for individual and collective action (IPBES, 2019; World Economic Forum, 2020; WWF, 2020).

BOX 2: RECURRENT ISSUES ENCOUNTERED IN IMPACT ASSESSMENTS AND MITIGATION PLANNING IN GREAT APE LANDSCAPES

- Integration of biodiversity and ecosystem services as core inputs into land use planning processes and SEAs has been inconsistent and inadequate.
- SEAs often miss opportunities for pre-emptive early avoidance of impacts to important ecological and social values.
- SEAs and resultant plans rarely provide pragmatic action or activity-oriented management plans to deliver change on the ground. Actions are often not taken into project level ESIAs.
- Difficulties in ensuring adequate and useful public involvement (or participation) in ESIA/SEA processes.
- Production of ESIA reports which are not easily understood by decision-makers and the public because of their length and technical complexity.
- Weak linkages between ESIA report recommendations on mitigation and monitoring, and project implementation and operation.
- Limited technical capacity to conduct and implement ESIA. Large consultancy companies are often contracted to perform ESIAs. Such companies are seldom experts in ape conservation. While the International Finance Corporation (IFC) and other development or private banks require external experts to be involved, there are no current standards as to what qualifies anyone as an expert to make decisions or advise on apes.
- ESIAs seldom use great ape specialists in the consultation process when defining impacts and potential mitigation and management options. E.g. they do not consult with the IUCN Species Survival Commission (SSC) Primate Specialist Group sections on Great Apes and Small Apes Avoidance, Reduction, Restoration and Compensation of negative impacts from Energy, Extractive and Associated Infrastructure Projects on Apes (ARRC) Task Force which provides access to expertise within the IUCN SSC.
- Assessment of sensitive biodiversity features, such as critical habitat, is often done after activities have already been designed and begun. E.g. in Guinea, West Africa, exploratory drilling and mining and processing plans for one company's project were in place before critical habitat studies for chimpanzees were conducted. These habitat areas need to be identified prior to any permitting or land use allocation to ensure avoidance of ape habitat.
- Study periods often too short to demonstrate clear understanding of the seasonal and medium term natural variance in ecological and behavioural conditions.

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- ESIAs tend not to take into account fundamental aspects of sociobiology and behavioural ecology of great ape species and the implications of these on impacts assessment and mitigation and management options, such as: life histories; the size of home ranges and territories; the threat of poor health and disease vectors to ape populations; great apes as keystone species that are important in e.g. the dispersal of seeds and the maintenance of ecological function and health of habitats. Consideration of the spatial and temporal implications of this in the assessment of impacts and the design of management actions is fundamental.
- Often poor consideration of impacts of noise, dust, human presence and movement in terms of disruption to great ape behaviour and socioecology (i.e. how they interact with each other both within groups or between different groups/populations).
- Inadequate consideration of the loss of composition and structure of habitat in terms of the energy budgets required by great apes to secure health and resilience with respect to breeding success, fecundity, social stability, particularly in a changing climate. E.g. loss of food sources and diversity during different times of year may impact on breeding potential.
- Inadequate consideration of induced and indirect impacts to great apes, particularly with increased threat of poaching, human-wildlife conflict, diseases exposure and transmission, competition for land from in-migration of people through increased access to ape range, and from land conversion to agriculture.
- Assessments of ape populations in a landscape are often inadequate, not taking into account the size and composition of populations required to ensure and maintain genetically robust wild populations that can survive and successfully reproduce in their natural habitats by conserving the ecological integrity of landscapes and managing their ecosystem services sustainably.
- The assessment of cumulative impacts of multiple sectors are often not taken into account, nor the ancillary infrastructure associated with each sector. It is essential to establish the true spatial and temporal influences as industrial development projects rarely occur in isolation and the environmental impacts of these projects may be magnified by other projects in the same geographical area.
- Poor attention to ecological patterns and processes when considering ESIA in ape range. Species viability in forest patches depends on many factors, including the area of habitat, the size and shape of habitat patches, and the connectivity between patches. Not only does fragmentation disrupt the distribution and abundance of species, but it also affects the ecological processes that are part of the ecosystem (Leader-Williams & Dublin 2000). Management and mitigation plans therefore need to consider what makes most ecological sense for ape conservation (Kormos et al 2014).
- The mitigation hierarchy is poorly applied with little attention given to avoidance and minimisation aspects, particularly in terms of ecological context at a functional spatial and temporal scale.
- There is often an assumption that residual impacts are offsettable for great apes. The basic premise, as recognised by IFC, is that all great apes are critical habitat species and net gain outcomes for the species need to be designed into any management actions designed to mitigate development activities in a great ape landscape.

- When assessing baseline populations and great ape habitat, the need to avoid critical ape habitat from the outset is poorly addressed. Project proponents tend not to work with government or civil society stakeholders to ascertain such avoidance areas and do not proactively declare areas of avoidance. This needs to be done prior to decision-making on development activities across all sectors.
- Priority focus need to be placed on improving mitigation of negative impacts to apes. With many apes living outside of protected areas, not only is there a need for increased protection of their habitat, but better management of the ecosystems in transition zones that are not currently protected.

A new business as usual - the CALM framework

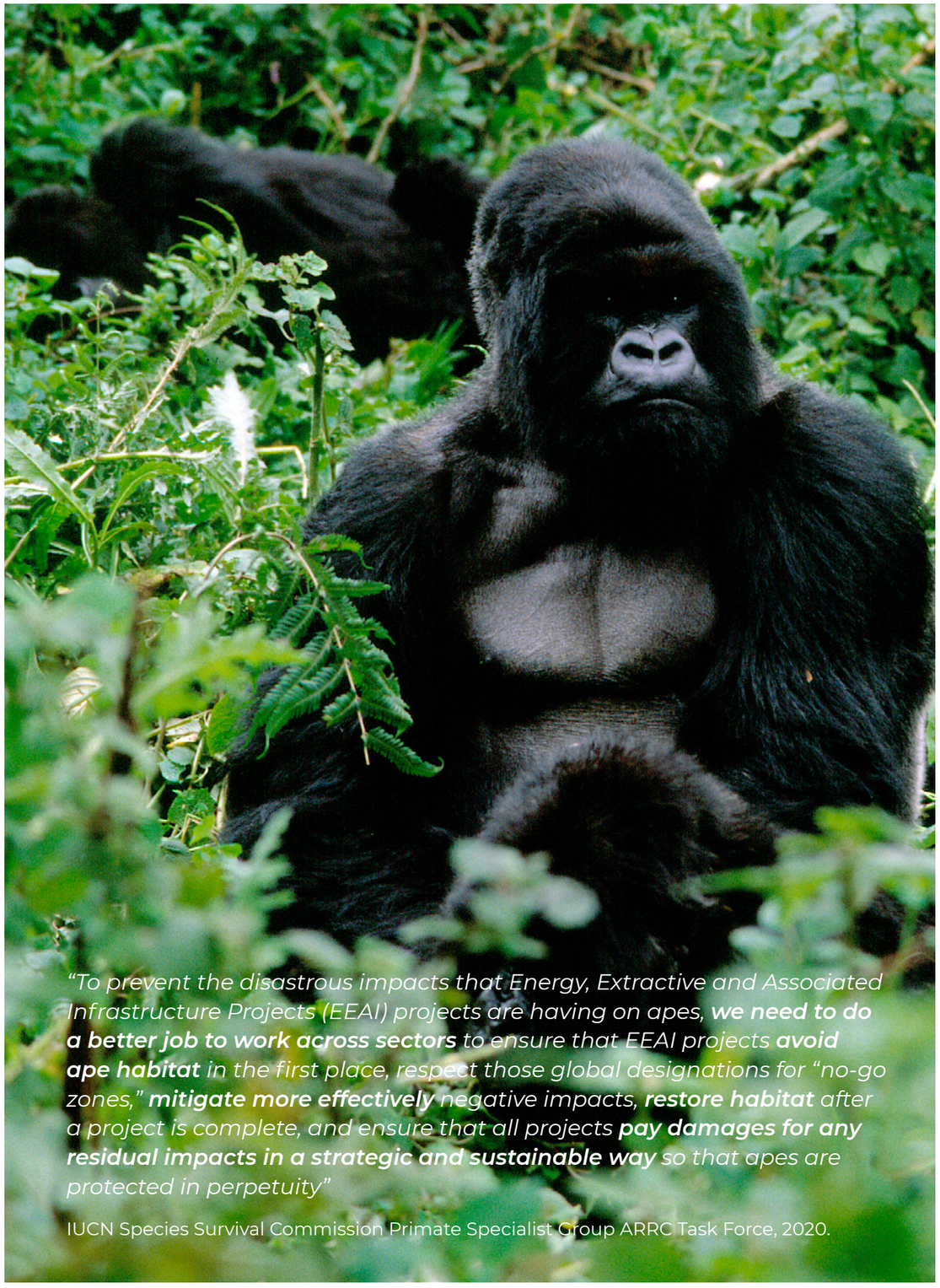
The four-step conceptual framework presented in this document brings together and builds on the strengths of existing concepts and approaches: **landscape approaches**, the **mitigation hierarchy** and the concept of **socioecological systems** (see next section). Maintaining sustainable landscapes involves managing numerous and diverse parcels of land which are owned and influenced by different people. This requires a good understanding of the landscape context and strong collaboration at different spatial and temporal scales (Willemen et al., 2014).

The framework is designed to embed nature into land use and development processes and calls for greater coordination and collaboration towards achieving common sustainable landscape objectives. Focusing on the roles of industry operators, regulators and other agents of delivery, the framework promotes landscape application of the mitigation hierarchy to improve the delivery of impact avoidance and mitigation, through coordinated and collective action at landscape and project scales. It provides recommendations for effective implementation through long-term, inclusive coalitions and partnerships and by ensuring broad stakeholder involvement on a range of issues, beyond the concession or production area, and working together in new ways to find pathways towards more sustainable landscape outcomes.

The framework is designed to be used in complex multi-use landscapes where pressure from concurrent developments is intensifying or anticipated and to address shortcomings in current business as usual management of multi-use ape landscapes in order that landscapes are resilient, development is sustainable and social and ecological values survive and thrive. As such the framework draws on case study examples relevant to great apes as flagship species to demonstrate the application of the framework.

Development of the framework has benefitted from inputs from a Technical Advisory Group and regional and subject specialists. The framework is accompanied by four case studies focused on multi-use landscapes that support populations of great apes in south-west Gabon, central and north-west Guinea, and a transboundary landscape spanning Guinea, Sierra Leone and Liberia. These focal landscape case studies elaborate aspects of the framework with empirically-driven examples. Background papers provide additional in-depth context on the projections for and impacts of multi-sectoral development in Africa and current approaches to impact mitigation and management. Further supplementary resources are available from FFI, and are referred to in the report where appropriate and listed in Section D with website links. . These documents can be read as stand-alone reports or as a package of materials. Due to travel limitations imposed by Covid-19, the framework has not been tested and piloted with stakeholders on the ground. However individual components draw on demonstrated good practice and case studies, and users can engage with the framework steps at the stage most relevant to them and their landscape context, and in the way that is most helpful to improve practice and outcomes.

Applying the mitigation hierarchy in complex multi-use landscapes in Africa



Credit: Juan Pablo Moreiras/FFI

"To prevent the disastrous impacts that Energy, Extractive and Associated Infrastructure Projects (EEAI) projects are having on apes, ***we need to do a better job to work across sectors*** *to ensure that EEAI projects* ***avoid ape habitat*** *in the first place, respect those global designations for "no-go zones,"* ***mitigate more effectively*** *negative impacts,* ***restore habitat*** *after a project is complete, and ensure that all projects* ***pay damages for any residual impacts in a strategic and sustainable way*** *so that apes are protected in perpetuity"*

IUCN Species Survival Commission Primate Specialist Group ARRC Task Force, 2020.

Introducing core concepts

The conceptual framework brings together and builds on the strengths of existing concepts and approaches: **landscape approaches**, the **mitigation hierarchy** and the concept of **socioecological systems** as described in this section.

Landscape approaches

A landscape is a socioecological system comprising a mosaic of natural and/or human modified ecosystems, with a characteristic configuration of topography, vegetation, land use, and settlements that is influenced by the ecological, historical, economic and cultural processes and activities of the area. Spatial configuration of different land uses and cover types and the norms and modalities of its governance contribute to the character of a landscape (Scherr et al., 2013).

Landscape approaches recognise the **multi-functional nature of landscapes** and, although they encompass a variety of mechanisms and approaches, at their core they **bring stakeholders together** to agree and implement a shared strategy towards more sustainable land and resource use (Mallet, 2018). This often involves finding ways to reconcile conflicting or competing land and resource uses and working across sectors and stakeholders towards a more integrated approach to landscape management that considers both human and natural systems as well as local needs and broader landscape or national objectives. Adaptive management, broad stakeholder participation, and system-level resilience are core principles of the approach (Sayer et al., 2013).

Landscape approaches are typically designed to achieve multiple objectives (e.g. enhancing agricultural production, improving water security, biodiversity conservation, climate mitigation, enhancing local livelihoods, etc.) and often require long-term commitment by multiple actors, including governments, to work together to change policies and practices.

Landscape approaches can help different sectors and stakeholders – individually or collectively – to recognise the relationships between different land uses, resolve shared problems, identify and respond to shared risks and/or achieve their respective goals in ways that reduce trade-offs and maximise synergies. A landscape approach can also help to prevent duplication of activities, build trust, create opportunities for effective communication, joint evaluations, learning, and shared ownership of project outcomes.

Over 400 multi-stakeholder landscape initiatives have been documented around the world (Heiner et al., 2017). Although private company involvement has been limited to date (less than a fifth of documented initiatives), this is starting to change and a growing number of companies are engaging in landscape coalitions recognising the benefits of such approaches for mitigating and managing sustainability risks (Estrada-Carmona et al., 2014; Milder et al., 2014; Heiner et al., 2017; Scherr et al., 2017; World Business Council for Sustainable Development et al., 2017; Reed et al., 2020).

For more information on landscape approaches and the importance of land use decisions on delivering a more sustainable future see: **The Little Sustainable Landscapes Book** (Denier, et al., 2015), UNCCD (2020) and **Landscapes for People, Food and Nature**. More landscape resources are listed in Section D.

Applying the mitigation hierarchy in complex multi-use landscapes in Africa

Credit: Juan Pablo Moreiras/FFI

Mitigation hierarchy

The mitigation hierarchy is a set of four prioritised steps to prevent and limit environmental harm as far as possible (Figure 1) through the application of systematic measures to first **avoid** and then **reduce** or minimise adverse impacts i.e. preventing impacts to biodiversity and ecosystem services. Where impacts cannot be prevented, actions are taken to **restore** (reverse or remediate) impacts and as a last resort, **offsetting** may also be required to compensate for damages (IFC, 2012; The Biodiversity Consultancy, 2015).

The mitigation hierarchy is often aligned with objectives of 'no net loss' or 'net gain' (or 'net positive impact')[6] for specified environmental components, with the aim to counterbalance the negative impact of the development or to make a 'net' positive contribution.

The mitigation hierarchy is widely accepted as an approach for managing impacts to the environment, particularly biodiversity, and has been embedded in national policy, legislation and ESIA regulations, the environmental and social safeguards of lender banks, corporate policy and commitments, and sector standards. For more information, good practice guidance and case studies demonstrating application see, for example: BBOP (2009a); IFC (2012); The Biodiversity Consultancy (2015). A mitigation hierarchy approach is increasingly being adopted in response to a range of landscape issues and targets, such as no net loss of biodiversity, Zero Deforestation and Land Degradation Neutrality.

6 'No net loss' is a goal for a development project, policy, plan or activity in which the impacts on biodiversity it causes are balanced or outweighed by measures taken to avoid and minimise the impacts, to restore affected areas and finally to offset the residual impacts, so that no loss remains. Where the gain exceeds the loss, this is referred to as 'net gain' (or 'net positive impact'). No net loss or biodiversity net gain must be defined relative to an appropriate reference scenario ('no net loss of what compared with what?') (BBOP, 2012b)

Figure 1 Mitigation hierarchy steps and example actions at the project level

Step	Example action
Avoid	Active measures to avoid an impact (e.g. arrangement of the project's footprint to avoid the conversion of natural habitat or re-routing of linear infrastructure to circumvent areas of important biodiversity and/or ecosystem service value) prior to the impact occurring.
Reduce	Active measures to reduce or minimise impacts that cannot be avoided entirely, by reducing their intensity (e.g. reducing operational lighting and noise volume), extent (e.g. implementing invasive species control measures), duration (e.g. controlling personnel access to sensitive sites) and exposure (e.g. installing wildlife crossings to reduce collision risk on road).
Restore	Measures to actively remediate impacts (e.g. restoring degraded habitat on the project's footprint) or to facilitate passive recovery (e.g. removing barriers to connectivity to facilitate the dispersal of pollinators needed for habitat regeneration).
Offset	Physical actions and management of biodiversity that improves or restores previous damage (e.g. actions to improve habitat that has been degraded through overgrazing) and/or prevent or avert imminent or projected threats (e.g. from unregulated harvesting of timber or land conversion for agriculture), implemented to achieve a no net loss or a net gain outcome. Offsets or ecological compensation may be necessary where significant residual impacts remain after projects have taken adequate and appropriate prior mitigation measures. Offsets / ecological compensation should be planned and implemented following best practice guidance (BBOP, 2012a) as well as relevant national-level policy and legislation.
Proactive conservation actions	

Alongside the implementation of actions to prevent, remediate and compensate for impacts, project proponents are encouraged to deliver proactive and additional conservation actions, the effects of which may be difficult to quantify and may or may not directly respond to impacts.

The mitigation hierarchy has traditionally been applied at the project level. However, to be fully effective it needs to be applied at a landscape scale, although not new, it is not widely applied at this scale. See Table 1 for a summary of the key characteristics of project and landscape level application. At the project level, mitigation hierarchy application is under the responsibility of the proponent and may be part of compliance requirements. At the landscape level, both proponent and government will be drivers for mitigation hierarchy application as social and environmental objectives in the landscape are delivered. Project level mitigation actions should be nested into landscape level actions, together designed to contribute to meeting jurisdictional-level biodiversity targets and resolving other issues such land degradation and based on a landscape approach. When the mitigation hierarchy is implemented at a landscape level, the framework captures and coordinates contributions to regional, national and global, promoting long-term, sustainable outcomes for species, ecosystems and society.

Table 1 Summary of key characteristics of mitigation hierarchy application at the landscape and project level (Supplementary Resource 'Applying the mitigation hierarchy at the landscape level' provides more information - see Section D for details).

LANDSCAPE LEVEL	PROJECT LEVEL
• **Ensures the consideration of ecosystem scale implications of project impacts.**	• **Supports sustainable management of biodiversity and ecosystem services within the project area of influence (e.g. project footprint, concession area, management areas).**
• **Takes consideration of implications of development beyond project spatial and temporal boundaries as set in traditional ESIA and SEA approaches.**	• **Application is associated with project-induced impacts.**
• **Ensure the consideration of project impacts in the context of cumulative impacts of other projects in the landscape, specifically focusing on accumulation of impacts on ecosystem function, health and integrity and thus includes ecosystem services in the landscape.**	• **Losses and gains to biodiversity and ecosystem services are relative to the baseline conditions of impacted biodiversity and ecosystem services at a specific point in time, usually before the project impact has occurred.**
• **Supports the nested approach to integrating project-level mitigation actions into broader ecological units.**	• **Can be applied by the project alone in its simplest form, but benefits from expert and stakeholder consultation throughout, and collaboration on implementation to secure outcomes.**
• **Actions are complementary conservation and restoration activities, increasing the likelihood of their success.**	• **Application of the mitigation hierarchy framework is improved if it is applied to achieve a measurable no net loss or net gain objective for specified biodiversity.**
• **Application is linked to impacts in a broader landscape context.**	
• **Focused on targets of what is desired for conservation, restoration or development at the national or jurisdictional level, taking into account the positive or negative contribution to ecosystem status of an individual project's impact (and can take into account the losses and gains of individual projects).**	
• **Requires multi-stakeholder collaboration and partnerships to identify target areas and priority actions, and to drive and support implementation of actions.**	
• **Places the measures to avoid, reduce and restore biodiversity and ecosystem services in the context of ecosystem integrity and resilience and highlights this importance for land use planning.**	
• **Supports the decision-making required to implementation of international commitments and processes to halt biodiversity loss and land degradation, deforestation and climate change.**	

Socioecological systems

A socioecological systems approach recognises **people and nature as part of a single system,** inextricably linked in complex and adaptive relationships (Berkes & Folke, 1998; Folke et al., 2016) (Figure 2). Individuals, communities, economies, societies and cultures depend on and value nature in diverse ways and are constantly shaping and being shaped by natural systems. Taking a **systems approach** is important as it shifts the focus from individual parts of the system (e.g. nature or people, a single species or group), to how those parts are organised and related, recognising that their interactions are not static and constant but dynamic and fluid (i.e. they are always changing) (Forum for the Future, 2020). It also recognises that complex systems have boundaries (also called thresholds or tipping points) beyond which the system will rapidly reorganise into an alternative regime or result in system collapse.

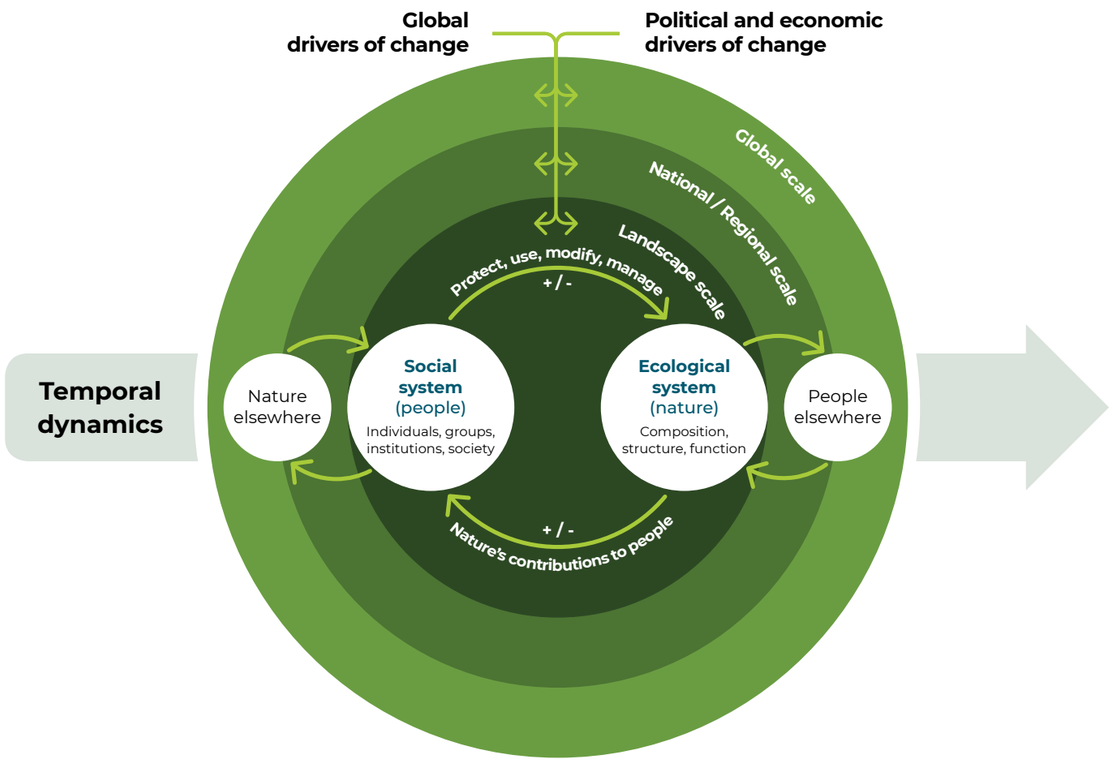


Figure 2 Socioecological system. Adapted from Fischer et al. (2015)

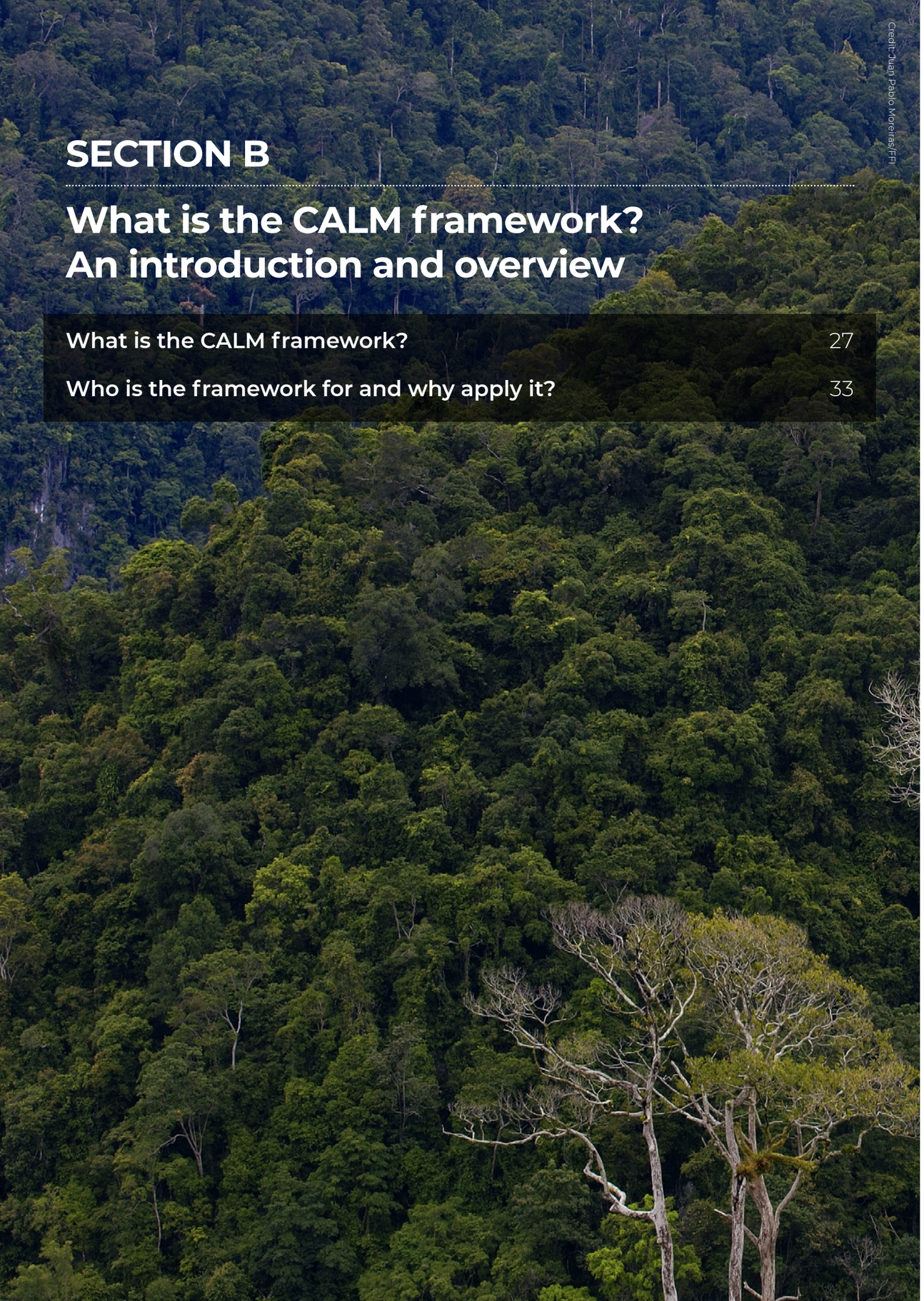
The contributions of ecological systems to people can be in the form of material (e.g. food, fibre, clean water) and nonmaterial benefits (e.g. spiritual, aesthetic, religious, education, scientific values) as well as in the form of supporting and regulatory ecosystem services (e.g. forests regulating local microclimate, soil biodiversity supporting soil health). Nature-human interactions can also result in negative effects on people (e.g. through the transmission of infectious diseases, or crop raiding behaviours by individuals or groups of certain species). People are deeply connected to nature as they use, modify, care for and manage ecological systems with a range of positive and negative effects for the composition, structure and function of ecosystems. The balance of negative effects tends to outweigh the positive as thresholds for ecological health and function are often breeched. Furthermore, the complex patterns and processes in an ecosystem can be disrupted, with impacts in any one part of the system having repercussions throughout the whole system.

To understand how decisions and actions relating to the use of land and natural resources affect social and natural systems, it is therefore necessary to consider the system as an integrated whole rather than discrete parts. This is opposed to the traditional view of discrete parts within a landscape that are derived from artificial boundaries, such as a project's direct footprint. Having this wider view, a project can help to anticipate unintended effects from project development, assess possible cumulative effects for the health, function and resilience of the living landscape, inform priorities for impact avoidance and identify additional opportunities for impact mitigation.

Guidelines and tools exist to support the integration of socioecological approaches into other impact assessment and planning frameworks, which is often through the consideration of ecosystem services and the benefits that stakeholders receive. The IFC Performance Standard 6 requires projects to maintain the benefits from ecosystem services through targeted mitigation programmes and supportive biodiversity management. To support the implementation of this at a project level, the World Resources Institute has developed a methodology for the integration of ecosystem services into impact assessment (Landsberg et al., 2013) and a guideline for identifying business risks and opportunities arising from ecosystem change in the Corporate Ecosystem Services Review (Hanson et al., 2012).

See Section D for a link to an animation explaining socioecological systems.

Credit: Elisabeth Villeneuve/FFI



Credit: Juan Pablo Moreiras/FFI

SECTION B

What is the CALM framework? An introduction and overview

SECTION B

What is the CALM framework?
An introduction and overview

Purpose and aims

The framework presented in this document puts nature firmly at the centre of land use and development planning recognising the fundamental role that healthy, resilient ecosystems play in human health, well-being and sustainable development. The framework is intended for application in complex multi-use landscapes and where pressure from concurrent developments on social and natural systems is intensifying or anticipated. It promotes an inclusive and integrated **landscape approach** to the avoidance, mitigation and management of adverse impacts from development that engages all sectors and scales of activity. The framework is premised on the natural landscape context and underpinned by **socioecological systems**. Delivery of the framework requires multi-stakeholder engagement and seeks to promote cross-sectoral and collaborative uptake and application of the **mitigation hierarchy**.

The main aims of the framework are to:

- Hard wire into land use planning, impact assessment and mitigation planning the **ecological requirements for biodiversity and ecosystem services** to persist and thrive.
- **Raise awareness of limits to land use changes and typologies** that can be tolerated in any landscape, defined by the capacity of ecosystems to sustain biodiversity and ecosystem functions, services and values including those on which businesses, communities and economies depend.
- **Promote the broad uptake and application of the mitigation hierarchy** across all sectors, and strengthen biodiversity outcomes to no net loss or net gain objectives in multi-use landscapes.
- **Drive pre-emptive action before permits and concessions are allocated and impacts occur to avoid negative impacts** on species and ecosystems and the functions and services they provide for people.
- Identify potential **opportunities and risks for effective mitigation** action by multiple actors, and **expose the limits to mitigation** opportunity in the landscape as well as opportunities and constraints for building resilience in the landscape.
- **Support more sustainable land use and development planning,** considering the potential impacts of different land uses, the options and constraints for applying the mitigation hierarchy and the different ways in which biodiversity and ecosystem services respond.
- Promote **inter- and intra-sectoral coordination and collaboration** to secure and improve impact mitigation outcomes and contribute towards landscape objectives for biodiversity conservation and the maintenance or enhancement of essential ecosystem services.

Overview of the framework and approach

Guiding principles

The following guiding principles underpin landscape application of the mitigation hierarchy. The framework strives to deliver these, acknowledging the dynamic and complex challenges needing to be addressed simultaneously by multiple parties in the landscape. Established best practice principles for conservation planning, ESIA, and SEA contribute to this framework and should be applied in its delivery.

- **Objectives-led:** an approach that seeks to avoid and mitigate impacts relative to agreed targets or desired outcomes for prioritised features in the landscape (e.g. a no harm or net gain objective for specified biodiversity features, forests, carbon emissions, etc.). The approach helps provide direction and drive decisions and actions at project and landscape scales in a way that responds to local needs and contributes towards project and landscape objectives.
- **Avoidance:** it is the most important step in the mitigation hierarchy and must be prioritised. It is the most effective way to prevent and manage potentially irreversible and costly risks and impacts on biodiversity, ecosystem services and socioecological systems with certainty.
- **Dynamic landscapes:** continuous, adaptive application of the mitigation hierarchy over space and time is critical to improve and secure intended outcomes from mitigation. Application should take into account responses to mitigation measures, new developments and threats, implementation of mitigation actions by other land users, and changes in biodiversity and ecosystem service values in the landscape. Given the pace of project development in some contexts, the assessment area may need to be reviewed periodically to ensure it remains relevant and takes into account changes occurring in the landscape.
- **Multiple scales:** landscape and project level planning and management processes have a crucial role to play in shaping ecological and social systems, mitigating and managing impacts on biodiversity and ecosystem services and driving positive outcomes on the ground. The mitigation hierarchy therefore needs to be applied at both landscape and project scales to respond to individual and cumulative impacts more effectively and contribute to landscape objectives.
- **Multi-stakeholder and cross-sectoral:** all stakeholders and sectors that depend on, impact and influence the landscape need to be recognised in the process. Although, only a subset of actors may be involved in the delivery of agreed solutions (Sayer et al., 2013). It is only through engagement with other stakeholders and sectors that we can understand the diverse needs, uses and values associated with species and ecosystems in the landscape, identify the range of impacts that may arise from development, risks of unsustainable trade-offs, and opportunities for effective mitigation.
- **Limits:** development should only occur within the boundaries of our natural systems. Only by operating within these limits can long-term, sustainable growth be pursued. This means establishing the boundary conditions that will avoid thresholds being reached and surpassed and then setting limits to the development impacts that can be tolerated. Explicit acknowledgement and adherence to avoiding impacts that cannot be effectively mitigated in any particular context is needed. These limits must be identified early and be used to guide conservation action and future land use decisions; a precautionary approach is required where there is uncertainty.
- **Resilience:** resilience at the landscape or systems level can be improved through the active recognition of threats and vulnerability, action to prevent and reduce threats, and to support the recovery of species, ecosystems and communities after impacts have occurred. Sharing learning can support improved understanding of context appropriate resilience building strategies.
- **Systems approach:** adopting a systems approach is crucial for anticipating how social and ecological systems are likely to respond to impacts from development and to mitigation action, acknowledging that responses will vary (e.g. between and within species, ecosystems, communities and landscape contexts).
- **Long-term planning and commitment** is required to achieve ecological, social and economic outcomes that are robust and sustainable. This will involve building long-term inclusive partnerships and coalitions so that stakeholders can work together to monitor and manage risks and find solutions. It will also require identifying sustainable financing to help maintain landscape planning and management processes over time and to ensure that outcomes are secured over the long-term.

Applying the mitigation hierarchy in complex multi-use landscapes in Africa

Framework steps and process

The framework is an iterative process that depends on multi-stakeholder engagement and cross-sectoral communication and collaboration. It is designed to be applied in multi-use landscapes where concurrent threats from multiple regulated industry projects currently, or will in future, threaten the persistence of great apes, other biodiversity values and the ecosystem functions and services on which people depend. Engaging stakeholders as early as possible and throughout planning, decision-making, implementation and adaptive management processes is fundamental to the framework application.

The approach is implemented through an initial planning and preparation phase followed by four overarching steps:

Step 1 builds an understanding of the current state of biodiversity and ecosystem services in the landscape (the socioecological baseline). This step defines the ecological and social baseline and identifies priorities and objectives for the landscape taking into account the diverse ways that stakeholders value, use and depend on nature, and the societal context in which people and nature co-exist (governing policies, institutions and processes, and socio-economic conditions). Priority areas for conservation and restoration are identified, taking into account the desired outcomes or targets (e.g. no harm or net gain) and limits to impacts that can be tolerated in the landscape (e.g. no further loss of chimpanzee habitat).

Step 2 identifies the existing and potential future threats and pressures on the landscape. These are considered in terms of the implications for and impacts on selected biodiversity and ecosystem services and for conservation priorities. Regulated developments (current and future) and other threats and pressures are considered, including those arising from unregulated land use and activities and from global change drivers, such as climate change.

Step 3 first contextualises each industry operation and its impacts within the landscape, with a focus on the contribution to cumulative effects. Secondly, it focuses on proactive mitigation planning through the strategic application of the mitigation hierarchy at the landscape scale, supported by the broad uptake and implementation of the mitigation hierarchy at the project scale by all sectors, taking into account individual and collective opportunities to contribute towards landscape objectives.

Step 4 focuses on the implementation of avoidance and mitigation action with two main purposes. First is to ensure the delivery of avoidance and mitigation actions in the landscape in an adaptive and coordinated manner, so that individual project actions work together to contribute to achieving sustainable outcomes for biodiversity and ecosystem services in the landscape. Second, is to deliver proactive avoidance and mitigation actions through collaborative and strategic application of the mitigation hierarchy at the landscape scale, ensuring appropriate structures and resources to enable collaboration are in place.

The process is illustrated in Figure 3. A description of the steps and main areas of focus within each step are provided in Section C, which emphasises some of the key considerations for ensuring that the guiding principles of the framework are applied. Examples of available good practice guidance and existing methods, tools and approaches to support the implementation of each step are collated in Section D and available in supporting case studies.

Figure 3 Overview of framework steps and process

Collaborative delivery of the framework

By focussing on the landscape, the relationships between people and nature are realised. This framework can help users to identify and initiate a dialogue among land users as part of a phased process. Over time, this will support the transitioning towards greater communication, coordination and collaboration within and among sectors, and with other landscape stakeholders and influencers. This may mean starting small, e.g. two or more operators from a single sector or a small cross-sectoral group discussing challenges, sharing information, piloting and testing approaches and process, and scaling up over time as the benefits of collaborative action are demonstrated. This can help to motivate additional industries and actors to engage.

Alternatively, the framework can be applied through a multi-stakeholder, cross-sectoral process from the outset. Steps 1 and 2 present an opportunity to convene industry, government and civil society actors to jointly assess and understand the landscape, identify conservation priorities and define objectives, better understand the breadth and magnitude of impacts from multiple concurrent and anticipated developments (taking into account activities of all land users), and to work together to find solutions. The process can be enabled through an existing multi-stakeholder dialogue platform, forum or by establishing such a coalition that supports the regular engagement of representatives from the relevant stakeholder groups. This can in turn help enable and support the practical avoidance, mitigation and management of impacts across a landscape.

Such multi-stakeholder platforms might be driven by, for example, a government or traditional authority, a multilateral donor, a sectoral group (e.g. Chamber of Mines or agricultural cooperatives) or a civil society organisation. The composition of the collaborative platform is generally contextually specific, depending on the stakeholders and the issues arising and objectives set in the landscape. What is crucial is that it must be multi-stakeholder and cross-sectoral – taking into account the different land uses and the responsible agents driving the development of these land uses (finance, government policy, companies, local communities, etc).

In initiating such a process, it is necessary to identify who the key players are, where the primary points of influence and power lie, and to identify the decision-making processes (from national to local) that could enable or participate in the delivery of this approach. The structure, governance and operation of the platform will be specific to the context and may benefit from having multiple smaller working groups focussed on addressing specific issues and objectives, and ensuring that all voices in the process are represented.

Types of questions the approach can help to inform:

The framework has been designed to help users address the following types of questions, beyond those that are explored in complementary tools and approaches:

- How can impacts from project development in the landscape be avoided and mitigated?
  - Which features and areas in the landscape need to be **protected** for biodiversity and ecosystem services to persist and thrive?
  - Which features and areas in the landscape could be **restored** to support biodiversity conservation, the maintenance of ecosystem services, and to sustain or strengthen landscape resilience?
  - What are the **limits to the impacts** that can be tolerated across the landscape if we want to retain or enhance prioritised biodiversity and ecosystem services, and maintain landscape resilience?
  - Are there **limits to mitigation opportunities** in the landscape? What are these and how can this inform decision-making?

- What is the most effective way to address cumulative impacts in a landscape?
  - How do **multi-sector impacts** affect the landscape and what is the potential for cumulative effects?
  - What opportunities exist for the **mitigation of cumulative effects**, and who needs to be involved?
  - What is the potential **compatibility of different sectors** or combinations of sectors with biodiversity and ecosystem service values and objectives associated with different parts of the landscape, taking into account their potential for mitigating impacts effectively?
  - Where are the **areas of compromise** (e.g. where are the areas that offer potential for high productivity e.g. in agriculture, and are of low biodiversity importance and could this provide opportunity to reconcile conservation and economic growth)?
  - Are the actions of **neighbouring land users** likely to undermine the effectiveness of mitigation measures? What opportunities exist to add value to the mitigation measures applied by neighbouring projects to promote positive, durable outcomes?
- **Who** needs to be engaged and what opportunities exist for **collaboration and partnership** to improve mitigation outcomes and contribute to landscape objectives?
- How can mitigation strategies **generate financial value** in the landscape and how can that value best be captured and shared? For example, through livelihoods generation or nature-based solutions[7].
- What **financing options and mechanisms** are available to ensure implementation and long-term viability of the interventions (partnerships, donors, collaborations and enterprise)?

None of these questions are of a purely technical nature, are easily answered using hard facts or with data alone. Multi-use landscapes in ape ranges are also changing rapidly and the assessment, mitigation and management of impacts must be adaptive and responsive to change. The process needs to be empirically-driven using best available science and best knowledge thus information will need to come from experts, landscape stakeholders and cross-sectoral actors, with first-hand knowledge of the social and ecological systems and their interactions.

7. Nature-based solutions are "actions to protect, sustainably manage and restore natural or modified ecosystems, which address societal challenges (e.g. climate change, food and water security or natural disasters) effectively and adaptively, while simultaneously providing human well-being and biodiversity benefits" (Cohen-Shacham et al., 2016)

Credit: Juan Pablo Moreiras/FFI

Who is the framework for and why apply it?
Users, business case and how the framework complements existing processes

Who can apply the framework and why?

National and sub-national government agencies

National and sub-national government agencies are primary developers and users of the framework. For a regulator, the framework is a decision support tool that integrates landscape level socioecological issues in the permitting and development process. The framework ensures that the regulator has the big picture in mind on what is important in the landscape from the perspective of biodiversity and the ecosystem functions and services on which people depend (Steps 1 and 2). This provides the regulator with information to help ensure that the socioecological values of the landscape are maintained or restored when making decisions about development in a landscape, for example, through permitting of a project (Step 3).

In addition to enabling laws, policies and robust compliance enforcement, the successful application of the mitigation hierarchy at the landscape and project level will require dialogue, partnership, and collaboration. Regulatory agencies play an integral role in this process, whether as a driver, facilitator, partner and/or active participant in the process, and must provide formal endorsement for the outcomes to be upheld. In contexts where inter-ministerial forums already exist, this can provide an important platform for cross-sectoral coordination and collaboration.

Local governments and traditional authorities will be important partners in landscape level collaborative processes and the delivery of action on the ground as they have a direct stake in the outcomes. Depending on the spatial scale of the process this may involve one or more local governments, and many traditional authorities.

Industry operators

All industry operators (new and already existing in the landscape) have a crucial role to play in applying the framework to their respective impact mitigation planning and management processes and in seeking opportunities for collaboration and coordination with others to improve the outcomes of mitigation measures. As a proponent, Steps 1-3 support and enable the contextualisation of a new project or project-related impact/s in the landscape, taking into account direct and indirect impacts and how these contribute to additive or cumulative impacts in the landscape.

The framework provides a vision beyond the fence, interrogating how induced and cumulative impacts relating to the project and other actors in the landscape impact the integrity and sustainability of the broader socioecological context. For existing projects, the framework helps users understand their role in mitigating impacts in a changing socioecological and development environment. Their data and information can make valuable contributions to Steps 1-3, facilitating the landscape assessment.

The framework encourages industry operators to identify and acknowledge their part in impacting (or undermining) the integrity of the socioecological system and then to address the complexity generated through both site and landscape level mitigation interventions. Stakeholder collaboration and partnerships with civil society and authorities are fundamental to the process. The framework encourages all proponents to contribute to the identification and delivery of landscape objectives, in order to manage complex sustainability risks relating to biodiversity, water, climate and social aspects, fulfil their respective mitigation commitments and to contribute towards net positive outcomes for nature and communities in the landscape (Steps 3 and 4). In turn, it supports the delivery of corporate or group level Environmental Social and Governance commitments.

Industry operators need to play critical roles in collaborative landscape processes to address sustainability risks. In some cases, for example where an operator or group of operators have a long-term stake in the landscape, it may make business sense to catalyse or lead landscape level processes that will directly benefit their own projects but also serve the wider landscape. This could involve initiating, building and supporting partnerships and networks of landscape actors, driving landscape level planning processes, lobbying for policy change (as part of the collaborative network), developing collaborative initiatives, supporting joint studies and data sharing, and co-funding interventions to promote sustainability in the landscape and address shared risks. Existing multi-stakeholder platforms demonstrate the positive effect of keystone corporates that were able to deliver leadership through inclusive decision-making and proactive example, focusing on wider sustainable landscape objectives.

Alternatively, industry operators may be approached to engage in collaborative landscape processes as active participants contributing information, experience, expertise and data to help build a shared understanding of the landscape context and landscape vision and to find solutions that meet multiple landscape objectives. Others may contribute by aligning their respective activities with identified aims of the collaborative platform or process and defined landscape objectives.

Agents of delivery

Other actors (internal and external to the landscape) have the potential to develop, implement and support processes to improve the information base on which decisions are made (Steps 1 and 2). These actors include impact assessment practitioners, civil society organisations, multilateral agencies, and researchers. Such actors can also play a pivotal role in catalysing and facilitating processes to initiate and improve collaboration and coordination and to help identify strategic priorities and partnership opportunities that will help enable industry operators to contribute positively towards landscape objectives. This may require the brokering or establishment of a multi-stakeholder platform that provides the structure and institutional governance between the parties (see Step 4 and case studies therein). This can be done by third parties to the process including an institution specifically established to undertake this function. It may be new or build on existing institutional structures. The involvement of relevant government entities in these processes is important. As private sector initiatives and public-private(-producer) partnerships continue to evolve, the role of government regulation of business activities and the work of watchdogs in monitoring activities on the ground will also play a crucial role (Reed et al., 2020).

Why apply the framework?

Benefits for national and sub-national government agencies

For government agencies the implementation of the framework can contribute to the following benefits:

- **Contribute towards national commitments** linked to biodiversity conservation, climate mitigation, water security and ecosystem restoration (e.g. targets set for biodiversity as part of national biodiversity action planning processes; emissions reductions targets; forest restoration commitments under the Bonn Challenge and AFR100; Land Degradation Neutrality targets; etc.).
- **Support progress towards more sustainable landscapes**, in which economic growth and industrial development is in balance with healthy and resilient ecosystems and communities.
- **Prevent costly and irreparable damage** to species and ecosystems and the functions and services they provide for local populations and businesses.
- Support **efficient and more effective implementation of regulatory requirements** (e.g. linked to permitting and ESIA processes), through improved knowledge and information to guide decision-making, improved capacity, responsible practises and collaboration among land users, and improved alignment of objectives at the project level by primary industry players with national and landscape level targets.

- **Deliver multiple benefits, including social, ecological and economic.** Increasingly there are examples of well-planned infrastructure developments that avoid ecologically sensitive areas, increase employment opportunities, reduce transport costs, and are better aligned to benefit local communities and agriculture (Ascensão et al., 2018). In the Amazon, evidence indicates that the strategic prioritisation of fewer road development projects in carefully chosen locations could dramatically improve environmental, social and economic outcomes whilst mitigating adverse impacts on forests, biodiversity and ecosystem services (Vilela et al., 2020).
- **Improve access to alternative and emerging finance.** Delivery of sustainable development objectives requires investment in action, interventions and activities. These can draw on increasingly innovative and targeted funding (e.g. statutory funds, climate finance, nature-based solutions, impact investment and private sector social and environmental enterprise investments designed) to support progress towards more sustainable landscape outcomes relating to, for example, biodiversity protection, increased carbon storage, improved water quality, more sustainable and climate resilient agricultural production and more.

Benefits for industry operators

For industry operators, implementation of the framework can contribute to the following benefits:

- Improved outcomes to biodiversity through mitigation actions at the project level. This could be through the **increased range of mitigation options** that are identified and explored for each impact, through to the **increased likelihood of successful outcomes from mitigation,** for example reducing uncertainty, cost efficiency or identifying and managing external pressures. The framework facilitates the **assessment and mitigation of complex sustainability risks and cumulative effects** in the wider interacting landscape.
- **Identify shared risks and opportunities** to reduce or share costs and mobilise resources to support collective action to scale up sustainability interventions (e.g. access to climate finance, fundraising for collaboration conservation programmes, aggregation of investment in biodiversity offsets).
- Support the **fulfilment of compliance requirements**, such as legal requirements, buyer or lender requirements or certification standards. At the company level, the framework can support the **delivery of voluntary corporate commitments** related to multiple inter-dependent sustainability issues, including those commitments that relate to biodiversity conservation (e.g. no net loss commitments), carbon neutral approaches or nature-based solutions.
- **Reduce the operational risk related to future scarcity of resources and ecosystem services** on which the operation depends.
- **Improve relations between private sector, government, local community members and other civil society actors** through transparent engagement, systematic analysis processes and informed decision making. This would support the operator to secure and sustain their social license to operate in addition to improving their credibility.

How the framework can complement and strengthen existing processes

This framework responds to recognised shortcomings in the business as usual management of multi-use landscapes (see FFI, 2021b for review). The framework process described in this report is intended to support, complement, and strengthen the outcomes of existing land use planning and impact assessment processes for species, ecosystems and the interdependencies between people and ecosystems. It is not intended to replicate or replace existing processes. Importantly, this framework helps to provide better understanding and awareness of the context of development to enable more cohesive and proactive management of impact and risk, and to draw different actors into a collaborative frame with a common objective. Table 2 below highlights several key differentiators of the framework and the gaps they respond to.

Table 2 Differentiators of the framework that can help to improve outcomes of current approaches

CURRENT APPROACHES	THIS FRAMEWORK
· Biodiversity and ecosystem services are often poorly attended to in land use planning and impact assessment, whilst the siloed approach to addressing issues based around themes (water, air, biodiversity, health etc.) means that the complex interdependencies between social and ecological systems are typically unacknowledged and impacts go unmitigated and uncompensated across the landscape.	· **Consideration of nature and socioecological systems are central to the process.** This approach ensures consideration of the socioecological inter-dependencies and ensures the health, function, resilience and persistence of ecosystems are considered and addressed throughout the impact assessment and mitigation planning process across all disciplines and scales.
· Impact assessment processes, whilst intended to ensure that all critical information to anticipate future impacts is considered in decision-making, do not necessarily result in environmental considerations being prioritised over other aspects, typically economic.	· **Sets limits based on what nature needs in order to persist and thrive** (e.g. no further loss of ape habitat) to bound decision-making and make losses and trade-offs explicit. This acknowledges that there are limits to the impacts that can be sustained in any landscape and that options for mitigation may also be constrained.
· Planning and impact assessment methods and approaches operate at a range of scales, each designed to deliver its own scope and objectives, yet they have largely failed to deliver an integrated approach to managing risks and impacts in complex landscapes.	· **Applies a multi-scale approach** that brings different frameworks and their individual scope and objectives into an integrated objectives-led process into which actions at project and landscape scales can contribute. By understanding the objectives of both social and biodiversity in the landscape, co-objectives can be developed and therefore co-management and co-design of solutions can be addressed.
· Regulatory systems typically examine circumstances on a sectoral basis, thus cumulative impact assessments often focus on a single sector (e.g. multiple mines) rather than taking into account cross-sectoral, cumulative effects at relevant temporal and spatial scales. Structural division and compartmentalisation of land and water management has compounded a segregated approach (e.g. cumulative impact assessments for multiple hydropower dams or tree plantations being conducted in isolation of one another despite both potentially impacting the same river system and communities).	· **Multi-sector with a focus on the assessment and management of cumulative impacts to biodiversity and socioecological systems** through both space and time, taking into account all land uses and by considering the limits to mitigation and the ability of affected biodiversity and ecosystem service to respond
· Environmental and social management plans – at strategic and project levels - often do not translate into practical action and results on the ground, whilst disparate, uncoordinated mitigation efforts of individuals industry operations can constrain or undermine outcomes.	· Promotion of multi-stakeholder processes and establishment of **cross-sectoral collaborations** is central to the framework. In this way, even in the absence of strategic integrated planning at the landscape scale, landscape actors are encouraged to come together to improve their understanding of the landscape, identify shared risks and issues, and find solutions. This can help to improve the outcomes of individual mitigation efforts, mitigate and manage cumulative effects and contribute to landscape objectives.

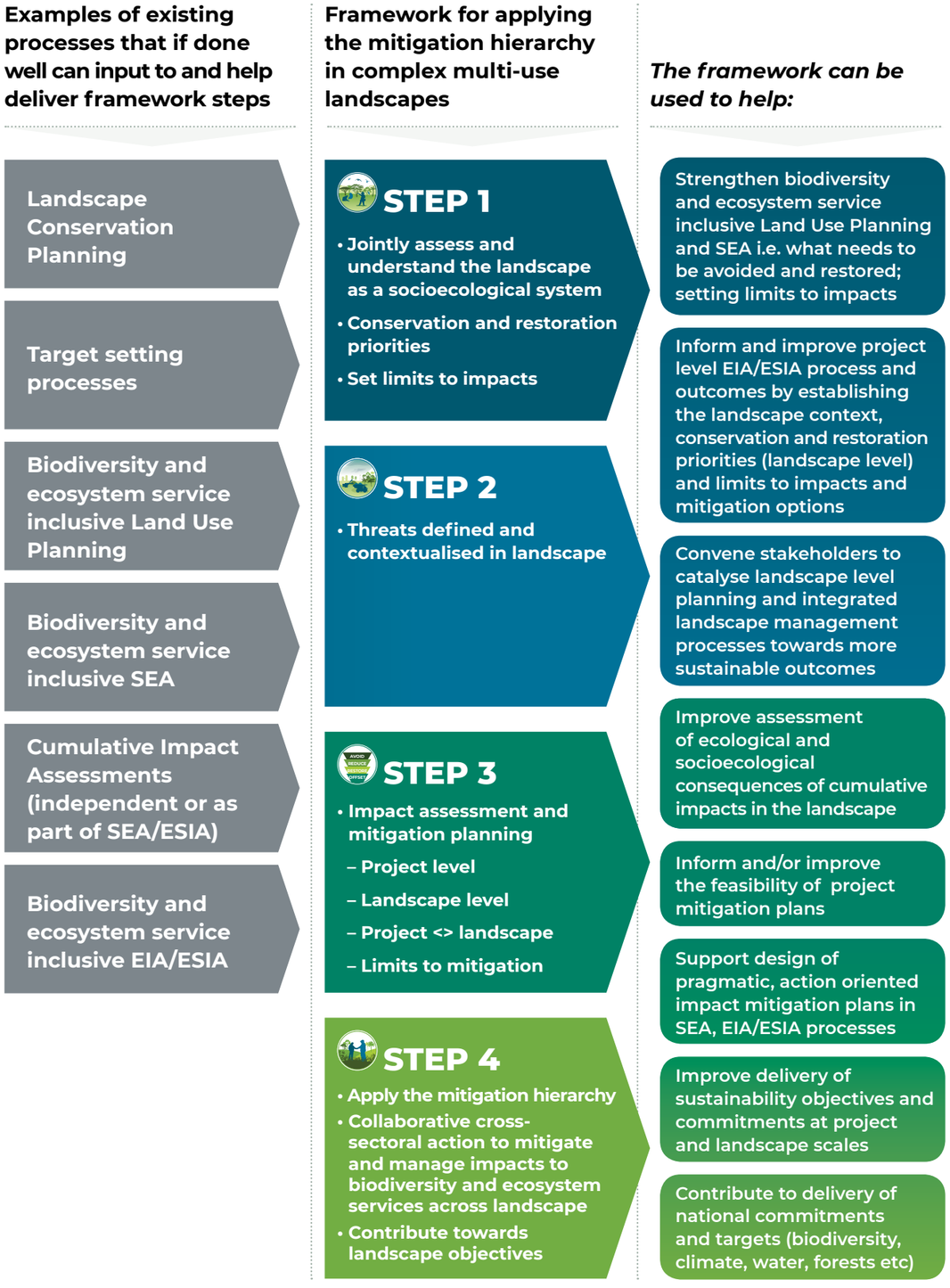
Sources: FFI, 2021b and references therein

See Section D for more details on the relationship between this framework and other impact assessment related processes and tools.

The framework is aligned with and supports the recommendations of biodiversity and ecosystem services inclusive impact assessment guidance e.g. Brownlie & Treweek (2018); Geneletti (2016; IFC (2013); Landsberg et al. (2013). It advocates for an integrated, multi-stakeholder and cross-sectoral landscape approach to improve the assessment, mitigation and management of risks and impacts on socioecological systems. The framework calls for all parties involved in landscape planning and assessment processes, project financing and development (including project planners and engineers) to understand the links between biodiversity and other disciplines, to contextualise this in the landscape, and to ensure that nature and nature based solutions are central tenets of mitigation strategies to address a range of sustainability risks.

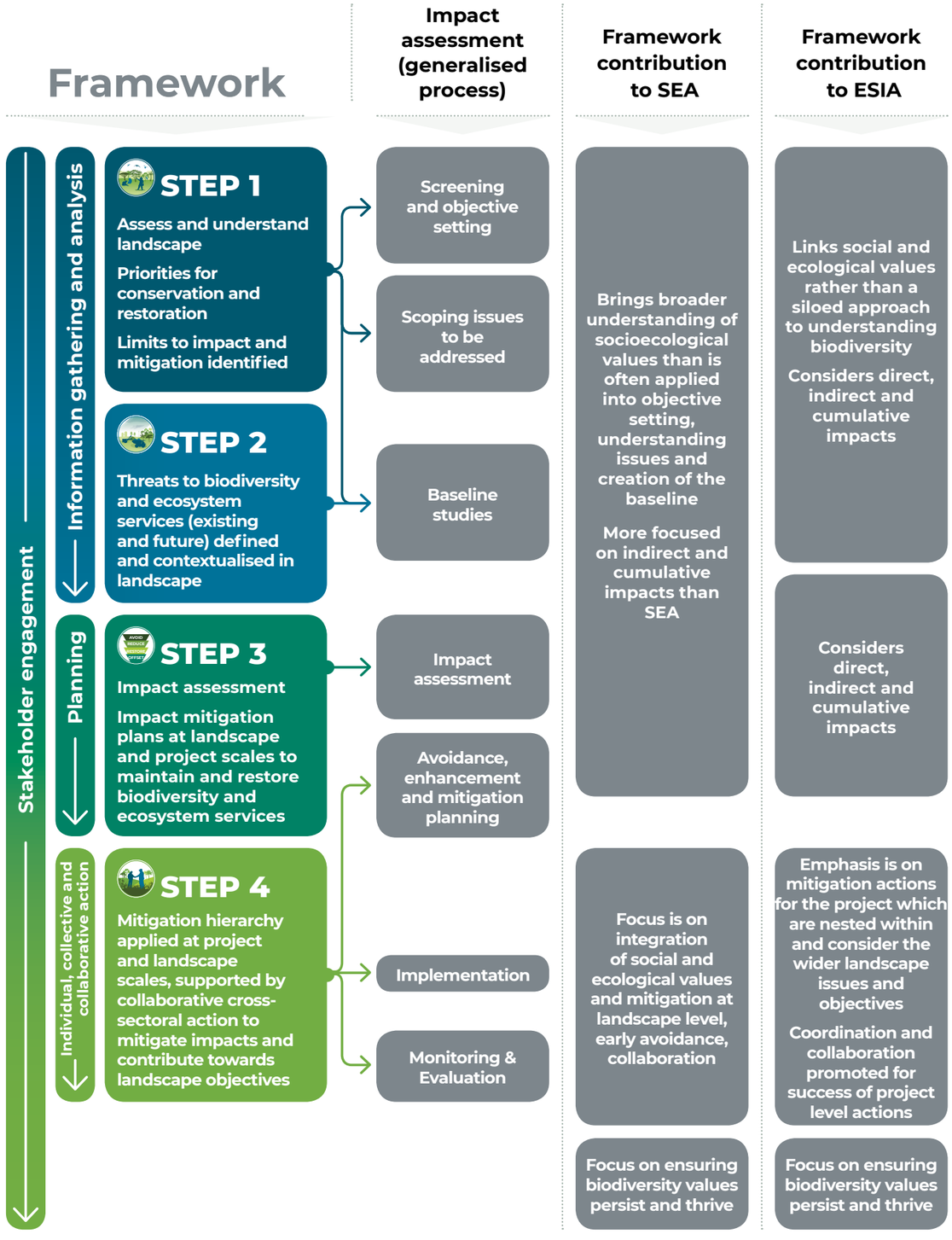
Framework application can be informed by the outputs and processes of land use planning, strategic and project level impact assessments (SEAs and ESIAs), systematic conservation planning, among others and can be usefully applied to cover gaps in these well-established processes to enhance their scope and delivery (see Figures 4 and 5).

Credit: Jeremy Holden/FFI



SEA: Strategic Environmental and Social Assessment. EIA: Environmental Impact Assessment. ESIA: Environmental and Social Impact Assessment

Figure 4 Generalised relationships between the framework and existing processes



SEA: Strategic Environmental and Social Assessment. EIA: Environmental Impact Assessment. ESIA: Environmental and Social Impact Assessment

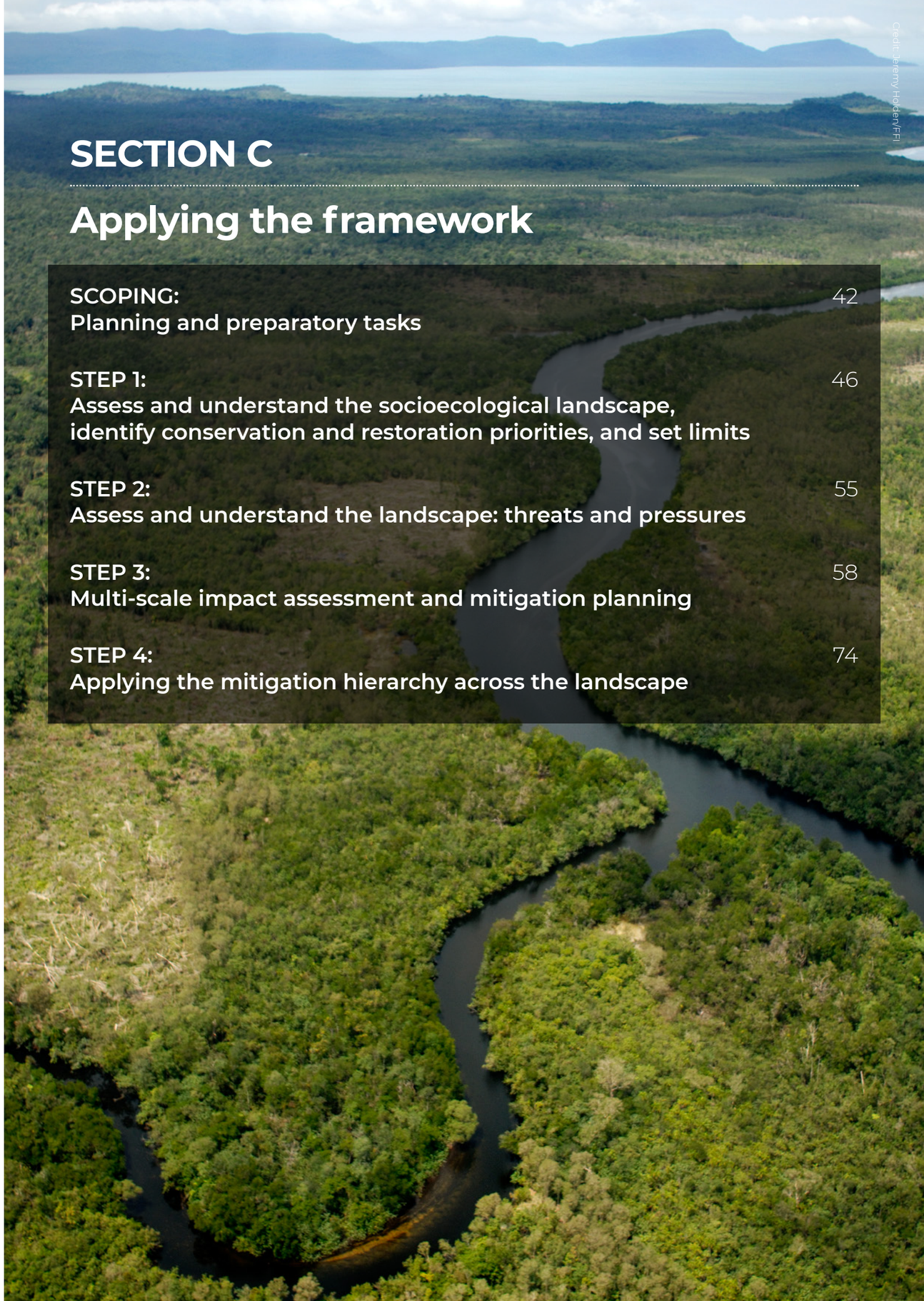
Figure 5 How the framework could complement and strengthen impact assessment processes

Conditions for successful implementation of the framework

A number of factors can contribute to the successful application of the framework:

- Available data and information on biodiversity, ecosystem services, socioecological systems and developments and the desire for each actor to contribute their data to build the repository of available information.
- Opportunity to apply preventative measures of the mitigation hierarchy before an impact is realised, resulting in safeguarding priority areas for biodiversity and ecosystem services.
- Available funding to support implementation of the framework process, including financing to help establish, strengthen and sustain multi-stakeholder, cross-sectoral processes or platforms to drive or support framework application.
- Political will, institutional structures, coordination mechanisms and capacity to enable and support the process and to endorse and apply framework outcomes (e.g. limits to impacts upheld through land use planning and permitting processes etc.).
- Existence or emergence of platforms, networks or other forums for facilitating multi-stakeholder and cross-sectoral processes in the landscape and/or at national scales.
- Establishment or willingness to implement policy and laws that support the application of the mitigation hierarchy, compensation of residual impacts, rigorous impact assessment and compliance with environmental and social management plans towards defined objectives (e.g. no harm or net gain).
- Opportunity to improve or expand the breadth of sectors and development activities that are subjected to mitigation hierarchy requirements. Commitment and capacity to implement the policy are essential.
- Individuals with the passion, commitment and capacity to champion the process, bring diverse stakeholders on board and maintain relationships and networks to help sustain the process over the long-term.

Credit: Juan Pablo Moreiras/FFI



Credit: Jeremy Hodgen/FFI

SECTION C

Applying the framework

SECTION C

Applying the Framework

The four steps of this framework were introduced above. This section provides a description of the preparatory tasks and sequential steps of the framework – what they are, why they need to be applied and what you need to do to drive or contribute to and support each step.

Existing guidance, tools and methods are available to support the implementation of each of the framework steps and a selection of these are highlighted in Section D. For this reason, specific detailed guidance and methods for application are not duplicated here and instead key questions are included to help users apply the framework as intended.

In its simplest form this framework is an approach and series of themes and questions to help users think about their landscape context and the effects of their decisions and actions on socioecological systems. The guiding principles of the framework are applicable to all land users and influencers.

Full application of the framework is particularly important where multiple developments or growth-inducing developments are planned i.e. infrastructure projects designed to catalyse development in other sectors and/or where there are multiple operations underway or planned in the landscape (e.g. multiple mines, large-scale agribusiness, roads, etc.). However, the roles that different actors play in delivering the framework steps will vary and will be influenced by the specific landscape context. Potential roles and responsibilities are expanded on under each step.

Scoping: planning and preparatory tasks

Defining the landscape area

Before engaging with the steps of the framework it is important to broadly define the landscape area. The extent of the assessment area can be larger initially than the final focal landscape area, as this will help inform stakeholder mapping and the data and information review (Steps 1 and 2). Both spatial and temporal limits or boundaries should be considered. The following considerations may help guide the appropriate scope of the assessment:

- Natural ecological barriers to movement, such as topographic features (e.g. mountain range or plateau), connected forest habitat block, ecosystem and water catchments and watersheds.
- Distribution of biodiversity values, including multiple species ranges and habitat extents. For species and habitats with small extents or defined population extents, the assessment area may encompass the entire distribution. However, for those species and habitat that are wide-ranging or of larger spatial extents, the assessment area will need to be refined based on other development variables (e.g. area of impacts) or ecological function in the landscape (e.g. natural barriers to movement).
- Natural and cultural values, including nationally or internationally recognised protected areas and cultural heritage sites.

Credit: Juan Pablo Moreiras/FFI

- The stakeholders who depend on or utilise ecosystem services, including the locations that communities access the ecosystem services or access routes to the ecosystem services if the stakeholders' location is at a distance.
- The full source-flow-resource pathway of the ecosystem services, and their relevance to biodiversity and society in the landscape. This will allow for impact assessment and scenario planning (e.g. forests targeted for sourcing wood for charcoal production and areas where it is then used, habitats as stocks from where bushmeat is harvested, the locations of the markets where it is sold and then transported to for consumption).
- Consideration of jurisdictional boundaries and how these align with the values that require management.

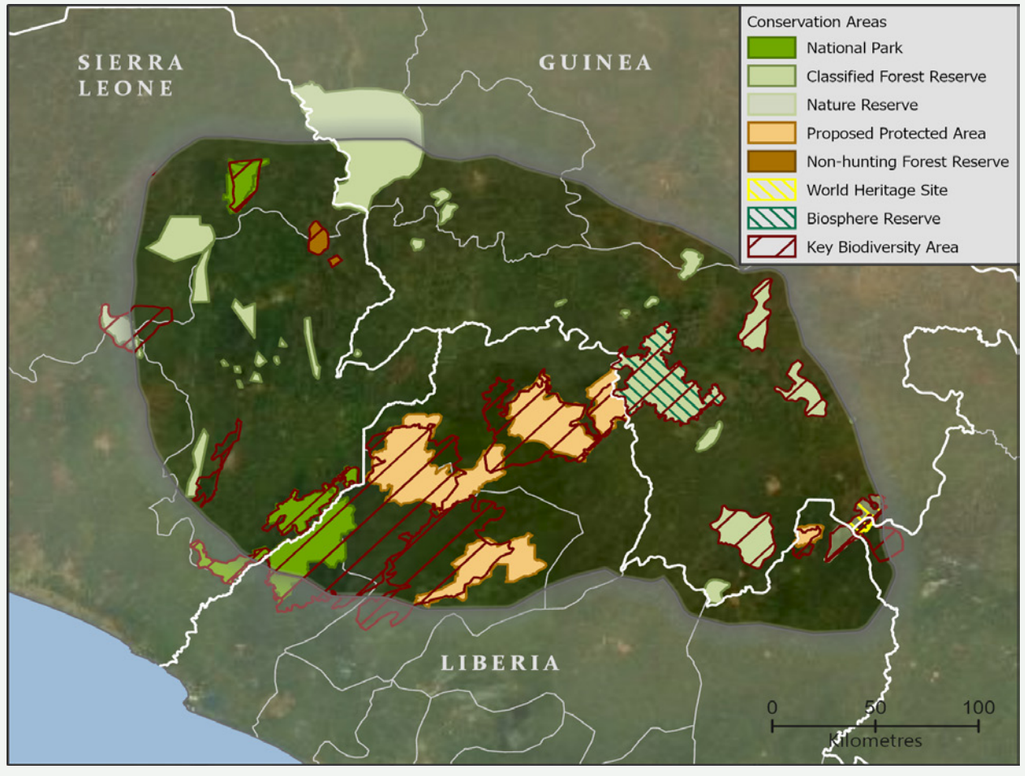
Box 3 illustrates some of the parameters that might be considered in defining an initial landscape area. Expert and stakeholder inputs and the availability of data and information will help to refine the extent and temporal limits of the assessment area.

Guidance on defining landscape boundaries is available and examples are included in Section D.

BOX 3: DEFINING LANDSCAPE BOUNDARIES

In West Africa, a transboundary area extending across the borders of Guinea, Liberia and Sierra Leone was selected as a pilot landscape to support the development and testing of this framework (FFI, 2021c). The landscape extent is only indicative of some of the biodiversity, socioecological values and developments that are considered in this framework, the following considerations informed delineation of the landscape boundary;

- Study area boundary aligned with intersecting protected and conservation areas.
- Northern and western boundaries aligned with drainage basin extents.
- Northern and western boundaries include the low-density populated provinces and town centres (University of Southampton, 2020).
- Northern boundary aligned with the transitional evergreen to semi-deciduous forest ecosystem.
- North-western boundary aligned with the Western Guinean lowland forest ecoregion (WWF, 2004).
- Western boundary informed by the commodity and shifting agriculture deforestation hot spot area (Harris et al., 2017).
- Southern boundary includes the intact forest landscape of the Kpo Mountain range (Potapov et al., 2017).
- Incorporates the known forest elephant migratory corridor between the Wonegizi-Wologizi Proposed Protected Areas, Ziama Biosphere Reserve and Mt Bero Classified Forest (Toupou, 2009) and known chimpanzee populations in Sierra Leone, Guinea and Liberia (Heinicke et al., 2019a,b).



Stakeholder analysis

Stakeholder analysis is the first stage of stakeholder engagement and provides the information necessary to develop a robust participatory design and consultation process for the application of the framework towards defined objectives. Mapping the stakeholders involved provides a visual representation of the analysis.

In any landscape there will be multiple, competing interests for land use (mining, agriculture, conservation) and stakeholders (internal and external to the landscape) will have different priorities and incentives for pursuing or altering decisions and activities. Whilst in some cases these can be complementary, in other instances their interests and actions may be in conflict.

Stakeholder analysis, mapping, engagement and active coordination and collaboration are fundamental to the application of the framework, engaging stakeholders as early as possible and throughout the planning, decision-making and adaptive management processes. Stakeholders may be individuals, communities or organisations.

Stakeholder analysis involves:

- understanding and identifying who the key stakeholders are in relation to framework application, and relevant projects or their role in a development scenario;
- understanding individual stakeholder interests and concerns and identifying shared interests and risks;
- understanding how, and to what level, they will influence the success or failure of the delivery of sustainable landscape objectives;
- identifying who is willing to collaborate and what the incentives and barriers to cooperation might be;
- prioritising who needs to be engaged (from government, civil society and private sector) and in what capacity / role;
- identifying legitimate entities and mechanisms (existing or needed) to support cross-sectoral and multi-stakeholder communication, coordination and collaboration;
- identifying who is best positioned to drive and support the process.

The stakeholders identified and mapped will depend on the engagement objectives. The initial stakeholder analysis may focus on identifying willing parties and understanding potential role and points of leverage and influence within the defined landscape (e.g. Which organisations have similar objectives or are already working on relevant issues? Who is responsible for making relevant decisions? Who has relevant expertise and capacity? Who has funding available?).

Subsequent stakeholder analysis is an iterative requirement and is often dynamic in terms of who and what needs to be involved at different stages of a project permitting and development cycle within the framework. Stakeholder analysis will therefore be revisited during each step and needs to be adapted to the purpose of delivering that step.

It is important to ensure the broad participation of all relevant stakeholder groups, particularly internal landscape stakeholders that may be highly dependent on land and natural resources for their well-being and economic activities. The assessment should take gender considerations and the needs of particular members and vulnerable groups into account.

STEP 1
Assessing and understanding the landscape, identifying conservation and restoration priorities, and setting limits

A stakeholder engaged, cross-sectoral and spatial perspective

Information gathering and analysis

Purpose: Step 1 provides the socioecological context for multi-use development in a landscape. It requires an understanding of the distributions, current state and trends of prioritised biodiversity and ecosystem services, what they need to persist and thrive, and the extent to which this is being met in the landscape. It is necessary to take into account the diverse ways in which people use, value, and depend on their environment, and the socio-economic and governance context in which people and nature co-exist. Step 1 builds an understanding of priority areas for conservation and restoration relative to desired outcomes or targets (e.g. no harm or net gain to important biodiversity values; zero deforestation to support commitments on carbon emissions reductions, water security objectives, etc) and identify the limits to impacts that can be tolerated in the landscape for these to be achieved.

Scale: Landscape scale (see preparatory tasks in Box 3 on defining the landscape area).

Who needs to be involved: Both project proponents and national and sub-national government authorities will play a key role as lead, partner and active participant in the delivery of Step 1. Project proponents must contextualise themselves within the landscape (identifying risks and impacts and opportunities) whilst authorities provide the enabling environment and formal endorsement of outcomes. Other actors (internal and external to the landscape) including civil society organisations, experts, multilateral agencies, and industry operators or cooperatives will play important roles in catalysing, implementing and/or supporting delivery (e.g. through partnerships, provision of expertise, funding, providing a coordination or facilitation role, etc.).

Process: The process typically uses spatial analysis, is informed by a range of information sources (e.g. literature reviews of species action plans, National Biodiversity Strategies and Action Plans (NBSAP), published research, etc. as well as impact assessment reports such as applicable ESIA and SEA), and requires stakeholder engagement and collaboration, and input from experts.

The main areas of focus under Step 1 are illustrated in Figure 6 and may be implemented simultaneously and iteratively so that the information and outputs generated through one activity can help inform and strengthen related activities. For example, establishing an understanding of landscape governance and the socio-economic context can help identify who else needs to be engaged to support the assessment and prioritisation of biodiversity and ecosystem services. The process builds on existing strategies and plans (e.g. landscape conservation plans, species action plans etc.) and available data and information and, where necessary, updates and extends them.

The process needs to align with existing plans, strategies and commitments. In contexts where landscape level conservation plans and targets already exist this will form the basis for taking the framework forward: reviewing, augmenting and/or updating the existing plan as needed, and ensuring awareness and understanding of the outputs of the planning process among all relevant stakeholders.

Credit: Juan Pablo Moreiras/FFI

A gap analysis is a useful preparatory exercise before embarking on Step 1 to identify what has already been done or is underway, review existing, available data and information and identify gaps that this framework can help to fill. A gap analysis to establish the plans, processes, information and data already available or underway for the focal landscape will inform the way in which Step 1 is applied, gaps that need to be addressed, and who needs to be engaged. Established methodologies and guidance are freely available to support the implementation of Step 1. Examples of available guidance, methods and links to relevant resources are included in Section D.

Where landscape conservation plans do not exist, Steps 1 and 2 present an opportunity to convene landscape actors and facilitate a multi-stakeholder, cross-sectoral process to generate a shared understanding of the current landscape and build a vision and action agenda to address agreed issues and risks.

Outcomes:

- Priority areas of biodiversity and ecosystem services in the landscape that need to be conserved and/or restored are identified, relative to desired outcomes or targets, and supported by stakeholders
- The socio-economic and natural environment within the landscape are described and better defined
- The governance and socio-economic context of the landscape are described and better defined
- The biodiversity and ecosystem targets and objectives in the landscape are identified and prioritised
- Limits to impacts defined and endorsed by authorities
- Multi-stakeholder process or platform established and functioning.

STEP 1

- Assess and understand landscape
- Priorities for conservation and restoration
- Limits to impact and mitigation identified

STEP 2

Threats to biodiversity and ecosystem services (existing and future) defined and contextualised in landscape

STEP 3

- Impact assessment
- Impact mitigation plans at landscape and project scales to maintain and restore biodiversity and ecosystem services

STEP 4

Mitigation hierarchy applied at project and landscape scales, supported by collaborative cross-sectoral action to mitigate impacts and contribute towards landscape objectives

What needs to be conserved and restored to maintain species, ecosystems and the essential ecosystem functions and services provided to people?

Socioeconomic and legislative context

Biodiversity & ecosystems services: uses and values

What is important, to who and why? What to assess and at what scale?

Requirements for persistence?

What do species, ecosystems and ecosystem services need to function and thrive?

Current state: baseline

What is the current state of the biodiversity and ecosystem services in the landscape and what are the baseline trends?

Identify priority features and areas to conserve, manage and restore in the landscape to maintain biodiversity, ecosystem function and services, and the uses and values derived by beneficiaries

What are the limits to development?

Figure 6 Main areas of focus and key questions under Step 1

Landscape governance and socio-economic context

Understanding landscape governance and the socio-economic context is a fundamental first stage in the process and builds on initial stakeholder analyses and engagement. It deepens understanding of the interaction between the environment, people, power and the economy and helps to establish the societal context within which species and ecosystems co-exist, impacts from development occur, and opportunities for mitigation and conservation must be realised. The inclusion of socio-economic factors alongside biodiversity and other values in spatial conservation planning is recognised best practice (Groves & Game, 2016; Karimi et al., 2017) and essential for developing strategies and plans to effectively prevent, mitigate and manage the impacts of development on socioecological systems.

Landscape governance is the set of rules (policies and cultural norms) and the decision-making processes of public, private and civic sector actors with stakes in the landscape that affect actions in the landscape (Graaf et al., 2017). A review of the institutions, laws and processes governing land and natural resource use and management at different scales must be coupled with an understanding of the power dynamics that influence the extent to which policies, rules and regulation relating to the environment are respected. In some contexts, for example, local and customary powers may be more influential than administrative or local government institutions (e.g. in parts of West Africa, while the government representative plays an important role, the authority of the village chief is paramount and no project or activity can be successfully implemented without the backing of village chief and elders: “the blessing of the village chief is more important than a formal document” P. Diallo pers. com. 2020). The participatory assessment of landscape governance is recommended, supported by available guidance (Graaf et al., 2017).

The assessment of the socio-economic context needs to take into consideration the dependencies, vulnerabilities and strengths of people living in the landscape. Relevant indicators include those relating to land and natural resource rights and tenure, livelihood security, health, education, access to essential services, water and food security, and poverty indices, among others. Where there is adequate data it may be possible to represent some of these indicators spatially.

An understanding of the landscape governance and socio-economic context can help to identify additional stakeholders that may need to be engaged in the application of the framework, identify complementary and divergent interests and incentives relating to land and natural resource use, and possible incentives and barriers to impact mitigation and management. For example, in parts of Guinea and Gabon cultural taboos around hunting and consuming apes have historically supported the co-existence of people and chimpanzees. In-migration linked to the development of mining, oil and gas and infrastructure is changing these cultural norms exacerbating threats to the species and undermining traditional values. Over time, this understanding can help to anticipate and mitigate conflict, create a space for communication, dialogue and mediation across the shared landscape, and promote collaboration.

Landscape values

To establish the socioecological baseline, the biodiversity components and ecosystem services that will be taken forward through the framework need to be identified and prioritised. This needs to consider the diverse values associated with species and ecosystems at multiple scales (local, national, international etc.) and how different stakeholders use and derive benefits from species and ecosystems. Iterative engagement with stakeholders to improve understanding of these aspects needs to underpin the delivery of the objectives for sustainable development using this framework.

Mapping priorities and values helps identify common goals and can improve land use, conservation and restoration planning (Buckingham et al., 2018). It can also help pre-emptively identify competing demands on ecosystems and potential conflicts and synergies. This is essential for a transparent and inclusive dialogue on acceptable trade-offs, and for designing effective mitigation action that takes into account ecological and social objectives for the conservation and sustainable use of biodiversity. It can further help in identifying opportunities for different stakeholders to work together to achieve shared objectives including the mitigation of shared risks.

At landscape scales, approaches to collating this type of information and data might need to be adapted. The nature of a wider landscape level assessment might not permit engagement with beneficiaries to understand the types of ecosystem services and natural products they depend upon and utilise. Moreover, the ability and/or willingness of beneficiaries to accept and utilise alternatives to the services they depend upon will likely be difficult and unsuitable to correlate and extrapolate across a landscape level. The representation of benefits can then be linked to the habitats, species and

ecological processes that underpin them across the landscape, which is usually better represented with data and information at these spatial scales. Land use planning decisions that are made at such landscape levels should acknowledge the limits to stakeholder and beneficiaries engagement and focus in on specific regions to take a more targeted assessment to feed data and information in from the ground-up.

Ecological requirements for persistence

Understanding what different species and ecosystems need to persist and thrive and the capacity of ecosystems to provide benefits for people and sustain these over time can be difficult for individual operators to appraise at project or site level. It requires an understanding of species ecology, population dynamics, and ecosystem service supply and flows the context of the wider landscape over space and time.

It is important to consider:

- ecological needs and preferences of key species, such as chimpanzees and gorillas (see Box 4), how the needs of species are shared or distinct, and the relationships between species;
- the environmental parameters affecting ecosystem service supply and flows over space and time (see also Box 5);
- the full suite of ecological features or areas that may need to be retained in the landscape to meet multiple objectives (i.e. for multiple species, ecosystems, ecosystem services);
- essential ecological patterns and processes (i.e. the diversity of species within an ecosystem, the structure of the physical elements of an ecosystem and the functional relationships and processes that occur between species and with the physical elements within an ecosystem) that maintain or improve landscape resilience and the ability of an ecosystem to adapt to pressures, threats and natural events.

Credit: Juan Pablo Moreiras/FFI

BOX 4: SOCIAL ORGANISATION AND ECOLOGICAL REQUIREMENTS OF PRIORITY APE SPECIES IN GABON

The severity and extent of an industry's impact varies depending on factors including the type of industry, quality of management and type of habitat where the company is operating. Of importance is understanding how a species will respond to any disturbance based on their social and ecological characteristics, and by extension identifying what features needs to be maintained in the landscape in order for a species to thrive (Arcus Foundation, 2014).

Gabon is home to significant populations of the sympatric central chimpanzee and western lowland gorilla. Both are found within forest landscapes of south-west Gabon where forestry and oil and gas sectors are active.

Having suitable natural habitat is one important variable that influences both gorilla and chimpanzee presence and density. Chimpanzees have a preference for intact forest. They are specialist frugivores that depend on seasonal fruiting trees for food and high canopy trees for nesting. In general they do not nest in trees under 15 metres. Gorillas are seasonal frugivores, prefer intact forest but will use open forest to fulfil dietary needs and for nesting. For the latter, although adaptable according to various environmental influences, the preference is for sleeping in herbaceous ground nests. Gorillas will also tolerate disturbed forest which is linked to growth in herbaceous vegetation that forms part of their diet. Overall, gorillas are more adaptable to disturbance than chimpanzees. This is due to their dietary and habitat preferences, but perhaps more importantly, are social traits relating to aggressive territoriality. Gorillas are not territorial and have limited social restrictions on their movement, however chimpanzees display aggressive and territorial behaviour with neighbouring groups. This influences the ability of chimpanzees to adapt to disturbance and find refugia, as it restricts their ability to shift spatial range without dispute with other groups, often resulting in death (Arnhem et al., 2007; Oelze et al., 2014; Morgan et al., 2018; Strindberg et al., 2018; Morrison et al., 2020).

Understanding what these species require to persist and thrive can inform priorities for conservation, represent areas of avoidance of impacts from developments, which developments are more appropriate, can trigger the requirements of impact assessments and mitigation commitments from certain-sector development projects or identify priorities for implementing restoration or appropriate compensation to ensure no outstanding losses to these species.

See Gabon case study (FFI, 2021d)

Current state and trends

Establishing the current state of biodiversity in the landscape requires an assessment of condition to help understand how well species, habitats and ecosystem services are currently faring. Habitat quality and habitat suitability assessments, population studies, and other measures of ecological and ecosystem processes can contribute to the process.

Spatial data (e.g. from impact assessments, species distribution data, conservation assessments, habitat mapping) is used alongside expert and stakeholder inputs and non-spatial information to help represent species and ecosystems and how they are distributed across the landscape. It can also be applied to represent certain ecosystem benefits, such as access to water resources being represented by river systems, the presence of specific trees representing the sources of timber and non-timber resources that stakeholders benefit from, and habitat types representing the potential presence of beneficial services such as important species for food sources and pollination processes.

This builds a picture of what the landscape looks like now and the state of biodiversity, a process that is further built upon under Step 2 where the current and future threats and pressures are considered. With this information we can start to better understand the parameters for viable, resilient species populations and ecosystems (i.e. what needs to be retained in the landscape), and their ability to continue to provide recognised values and benefits for people. This must recognise that at the landscape level, ecosystem services can only be reliably interpreted by the general benefits, services and products provided to people and so the emphasis here must be on the ecosystems, habitats and species that underpin them.

BOX 5: EXAMPLE QUESTIONS TO HELP DEEPEN UNDERSTANDING OF THE ECOLOGICAL REQUIREMENTS FOR BIODIVERSITY AND ECOSYSTEM SERVICES PERSISTENCE, CURRENT STATE (BASELINE) AND TRENDS

- **Species**
  - Is the population of a priority species declining, stable or improving?
  - What is the current population size/viability for a priority species?
  - What are the resource requirements of the species? What is their ecological niche?
- **Habitats**
  - How well represented are the extant habitats/ vegetation types within the landscape and wider scales?
  - What are the values that define the composition and the condition (quality) of each habitat/vegetation type?
  - What are the factors that facilitate habitat regeneration? What are the thresholds or impacts that may prevent habitat regeneration or result in a state change?
- **Ecosystem services**
  - Which ecosystems are valued, used and depended on by beneficiaries in the landscape and why? How does the service flow from the source to the beneficiary and how does the beneficiary access them?
  - What are the values that define the composition and the condition or yield of ecosystem services? What are the physical components and processes that underpin the services?
  - Is a priority ecosystem service considered degraded or acceptable by users?
  - Is the ecosystem service in short supply?
- **Ecosystems**
  - What are the important factors to be considered for maintaining or improving landscape resilience? (e.g. connectivity of forest in an ape range, habitat patch size maintained for amphibians, migratory range maintained for elephant as in the Kavango Zambezi Transfrontier conservation landscape).
  - Are there indicator or surrogate species and/or habitats that are representative of variables including biodiversity, ecosystem services, responses to impacts, regeneration and recovery? (e.g. use of habitats as a proxy for rare or uncommon species, or species that are difficult to reliably or regularly monitor; insects or small mammals that are indicators of disturbance or conversely, regeneration; amphibians and aquatic species (invertebrates and fish) that are indicators or ecosystem health or pollutants, where their decline or absence indicates a degradation or impacts).

Applying the mitigation hierarchy in complex multi-use landscapes in Africa

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Credit: Jeremy Holden/FFI

Identifying priorities, relative to targets or desired outcomes, and setting limits

Mapping of priority areas for species and ecosystems in the landscape is fundamental to understanding what needs to be maintained in the landscape for biodiversity and derived services to persist. Identification of priority areas builds on an understanding of what biodiversity exists where in the landscape, its condition and the benefits and services provided to people. There are various methods that can support this process, such as the IUCN Red List Assessments for Ecosystems or the mapping processes for the identification of Key Biodiversity Areas (see Section D).

In some cases, the current state of biodiversity and ecosystem services in the landscape might not be adequate to support priority species, ecosystems and ecosystem services into the future. For example, there might not be enough habitat area to support viable and persisting ape populations. Small or isolated ape populations may be particularly vulnerable to shocks such as disease and the effects of climate change and therefore these populations and the habitat that supports them need to be identified in the landscape.

With this insight it is possible to consider whether or not the system can tolerate further impacts and losses, and what the limits to impacts need to be (i.e. what type of impacts can be tolerated where in the landscape without compromising objectives) and the limits to what can be achieved through mitigation. For example, IFC Performance Standard 6 paragraph 73 stipulates no loss of any great ape, thus defining a limit to impacts. Similarly, it stipulates that impacts that cannot be mitigated to achieve a stated objective results in a fatal flaw in the project process therefore requiring radical alteration of the project design or location, or a no go alternative. It is important to recognise that not all impacts can be mitigated and that there will be constraints to what is possible to achieve in any landscape. For example, limestone caves are often impossible to restore and limestone-restricted species may be restricted to one cave or hill such that one extractive operation can lead to a global extinction (Birdlife/FFI/IUCN/WWF, 2014).

Data is an important requirement for spatial conservation planning processes and limitations in available data and information, in Africa and elsewhere, can present challenges for the assessment of priorities in the landscape. This reinforces the importance of engaging a broad range of stakeholders and experts in the process, ensuring that spatial analysis uses best available data, and making associations with surrogate or proxy datasets where there is limited or absent information on biodiversity and ecological processes.

Data limitations should not impede the integration of spatial analysis in landscape assessments and decision making; the need to create and collate data and information on biodiversity presents an opportunity to improve knowledge and understanding in a region and create databases that can be built upon and support decision making into the future. This can further build confidence and encourage data custodians to make their data available.

Identifying priorities is also the basis on which to explore what opportunities exist to maintain and improve the quality and/or quantities of biodiversity and ecosystem services (e.g. by addressing threats, ecosystem restoration etc.), and to build more resilient ecosystems that are better able to cope with stresses and adapt to climate change.

Setting objectives: what is the vision for the landscape and the desired outcomes for biodiversity and ecosystem services?

As part of understanding the landscape context, the governance and regulatory objectives must be defined. These objectives are drawn from the priorities identified in this Step and should align with higher level commitments/targets and regulatory objectives. These will become focal areas for the application of the mitigation hierarchy in Steps 3 and 4.

Outcomes-based targets are commonly set as goals for increasing the extent and condition of biodiversity, ecosystems and ecosystem services that need to be retained and protected in the landscape into the future. These targets can help to inform what kinds of developments are likely to be feasible in the landscape and at what scales, based on an understanding of associated impacts and opportunities for mitigation (Steps 2 and 3), whilst meeting conservation objectives and national sustainability goals.

In most cases, high-level targets already exist (e.g. as part of commitments under the Convention on Biological Diversity, ecosystem restoration targets established under the Bonn Challenge and AFR100, emissions reductions targets, and through targets set to achieve Land Degradation Neutrality) (Simmonds et al., 2019). Spatial planning processes can support the quantification of national or regional targets in collaboration with stakeholders.

Where no outcomes-based targets exist, or where these are too general, it is important that landscape appropriate targets are established through the right processes. Multi-stakeholder processes, supported by spatial planning, can help build a shared vision for the landscape, define desired outcomes and science-based targets for maintaining the amount, integrity and persistence of important biodiversity and ecosystem services at a wider scale.

A precautionary approach of no further losses (compared to the current state) may be adopted for high value species, habitat and/or ecosystem services (e.g. species at extremely high risk of extinction in the wild, such as the western chimpanzee) and/or where options for compensation are limited or unproven. An alternative objective might be no further net losses i.e. retaining the current state by requiring compensation for every loss across all development sectors (e.g. through biodiversity improvement measures such as the regeneration of habitat). In this case, and to avoid further biodiversity decline there must be proven mitigation measures and sufficient opportunity in the landscape for compensate to take place.

Desk-based case studies in three landscapes in West and Central Africa provide a high-level assessment in which aspects of the socioecological baseline are described using available spatial and non-spatial data. These are indicative only but provide useful illustration of the process and types of information that can support Step 1 (see Section D for links to case studies).

STEP 2
Assessing and understanding landscape: threats and pressures today and in future

A stakeholder engaged, cross-sectoral and spatial perspective

Information gathering and analysis

Purpose: Building on the current state and trends of biodiversity and ecosystem services in the landscape, Step 2 identifies the existing and potential future threats and pressures from multi-sectoral development (existing, planned and proposed) and contextualises these alongside other threats and pressures. Outcomes from Step 2 and Step 1 jointly inform the assessment of conservation and restoration priorities and limits to impacts, relative to desired outcomes or targets.

Scale: Landscape

Who needs to be involved: Both project proponents and national and sub-national government authorities will play a key role as lead, partner and active participant in the delivery of Step 2. Project proponents must contextualise themselves within the landscape (identifying risks and impacts and opportunities) whilst authorities provide the enabling environment and formal endorsement of outcomes. Other actors (internal and external to the landscape) including civil society organisations, experts, multilateral agencies, and industry operators or cooperatives will play important roles in catalysing, implementing and/or supporting delivery (e.g. through partnerships, provision of expertise, funding, providing a coordination or facilitation role, etc.).

Process: The process typically uses spatial analysis, is informed by a range of information sources e.g. literature reviews and review of applicable ESIA and SEA, and requires expert input, stakeholder engagement and collaboration. The main areas of focus under Step 2 are illustrated in Figure 7.

Outcome:

- Threats and pressures on biodiversity and ecosystem services defined and contextualised in the landscape and integrated into the outcomes of Step 1.

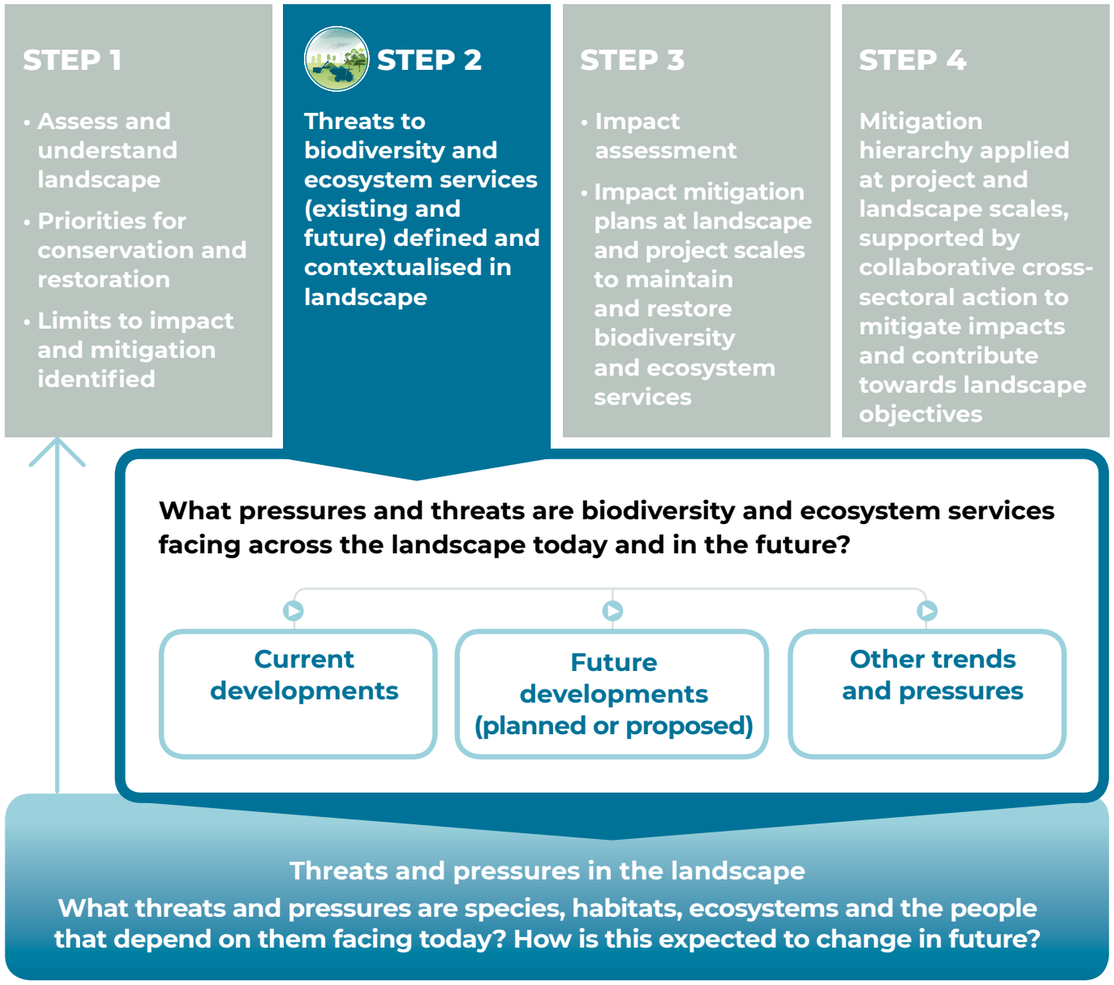

Figure 7 Main themes under Step 2

With an understanding of the current state of biodiversity, existing and future threats and pressures are defined and described. This involves identifying the type of industries (e.g. mining, forestry, agriculture, etc.), infrastructure (e.g. roads, railways, ports etc.) and other land uses occurring in the landscape and their scale and location in the landscape. Where spatial data are available these can be mapped against the socioecological baseline, which can be analysed in several different ways (such as the development of composite layers as summarised in Figure 8).

The assessment needs to take account of both regulated industries and unregulated activities in the landscape (e.g. small-scale farming) recognising that both can act as drivers of change in the landscape and can impact biodiversity individually and cumulatively, with implications for ecosystem services and human well-being.

Possible scenarios for future threats and pressures can then be described and explored with stakeholders. This should take into account planned and proposed developments and potential for induced growth in other sectors as well as other trends (e.g. projections for human population growth; climate change; urban migration etc). It should consider the potential for displacement of threats or pressures to other areas of the landscape and how beneficiaries of natural resources will be impacted, as well as potential responses of species to impacts (e.g. migratory species being displaced to other functionally equivalent areas; different troops, subgroups or families of apes being forced to used suboptimal habitat due to other historic or concurrent impacts and pressures).

By contextualising the activities in the landscape, and potential future scenarios, it is possible to explore where there may be challenges to achieving landscape objectives. This information further informs our understanding of the current state of biodiversity and ecosystem services, priorities for conservation action and limits to impacts (Step 1). The combined outputs from Steps 1 and 2 provide the basis for assessing individual and cumulative impacts and for mitigation planning (Step 3).

When applied through a multi-stakeholder process, this is an opportunity to explore potential future scenarios and to compare what might happen under business as usual, with the landscape vision and objectives established under Step 1.

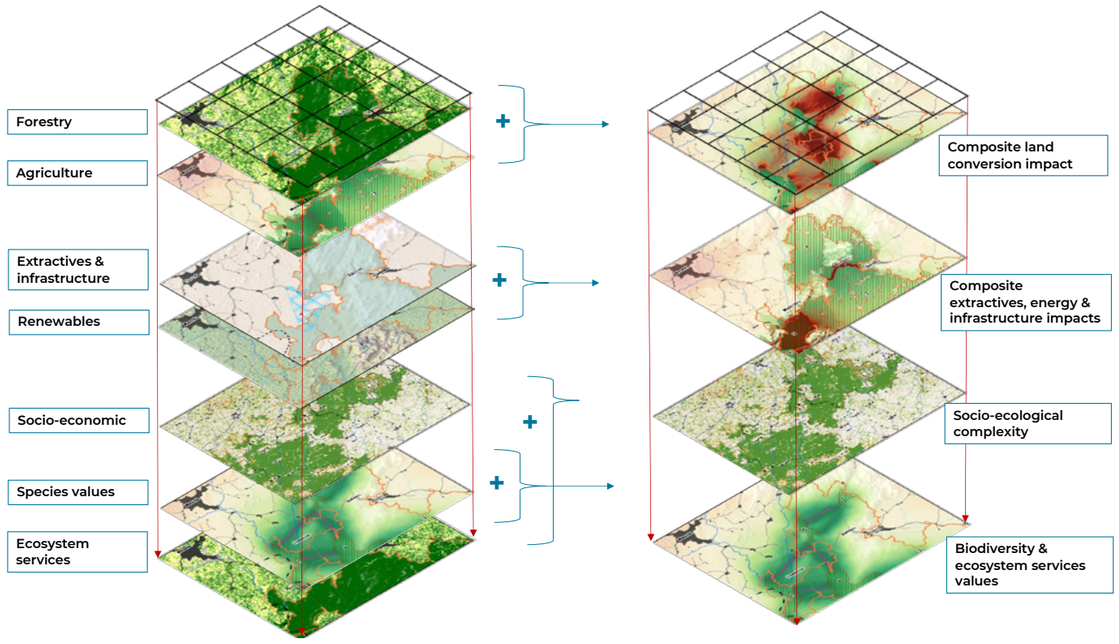

Figure 8 Landscape assessment process: building an understanding of the landscape from a spatial perspective, supported by stakeholder and cross-sectoral engagement

See the case studies (links in Section D) where threats and pressures have been explored through desk-based research and stakeholder interview in West and Central Africa.

STEP 3
Impact assessment and mitigation planning

Understanding implications of multi-sectoral development impacts and the opportunities for and limits to mitigation across the landscape

Multi-scale assessment and planning

Purpose: Step 3 has two main purposes. First is to contextualise each industry operation and its impacts within the landscape, building on the outcomes of Steps 1 and 2, and with a focus on the contribution to cumulative effects. Second, is to apply proactive mitigation planning through the strategic application of the mitigation hierarchy at the landscape scale, supported by the broad uptake and implementation of the mitigation hierarchy at the project scale by all sectors, taking into account individual and collective opportunities to contribute towards landscape objectives.

Scale: Multi-scale mitigation planning in which project level contributions are nested within the strategic landscape scale, the limits of which are defined by the extent in time and space of potential or anticipated impacts to the ecosystem and likely opportunities for avoidance and mitigation.

Who needs to be involved: Both project proponents and national and sub-national government authorities will play a key role as lead, partner and active participant in the delivery of Step 3. Project proponents must contextualise themselves within the landscape (identifying risks and impacts and opportunities) whilst authorities provide the enabling environment and formal endorsement of outcomes. Other actors (internal and external to the landscape) including civil society organisations, experts, multilateral agencies, and industry operators or cooperatives will play important roles in defining the impact severity and relevance as receptors and affected parties. Furthermore, the opportunities or constraints of avoidance or impact mitigation can be tested or assessed through relevant stakeholder engagement.

Process: The process is undertaken from both the project level and the landscape level – nesting one within the other. It forces the project proponent to look beyond the fence whilst ensuring landscape level land use planning takes into account the cumulative implications of multiple project developments on the ecosystem. It is informed through systematic review of activities, components and spatial and temporal dimensions of development in a landscape and how these impact or affect socioecological systems. Stakeholder and expert engagement is required to inform and validate impacts identified, and to ensure voice is given to affected parties and receptors during the impact assessment process. Avoidance and mitigation actions are identified through a stakeholder-engaged process, assessed for applicability and likelihood of success and then taken forward.

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Credit: Juan Pablo Moreiras/FFI

Guidance exists to support good practice impact assessment and cumulative impact assessment (for example, see: Richards, 2011; IFC, 2013; Landsberg et al., 2013; Jones et al., 2014; Gillingham et al., 2016; Brownlie & Treweek, 2018) and users of this framework are advised to consult available resources. However, this approach differs from traditional land use planning, SEA and ESIA approaches by starting with the ecological receptors in the landscape and by having objectives for biodiversity and ecosystem services in the landscape (defined in Steps 1 & 2) that drive development and impact mitigation thresholds and decisions at both landscape and project scales.

Figure 9 shows the main themes in Step 3 and illustrates the multiple scales of application and highlights areas of focus for this framework.

Outcomes:

- Improved understanding of possible cumulative impacts on the socioecological system
- Options for mitigation action to support biodiversity and ecosystem service priorities and objectives in the landscape identified
- Limits to mitigation opportunities in the landscape defined
- Improved uptake and application of the mitigation hierarchy by all sectors
- Stakeholder supported mitigation strategies and action plans in place
- Partnership opportunities identified to support implementation.

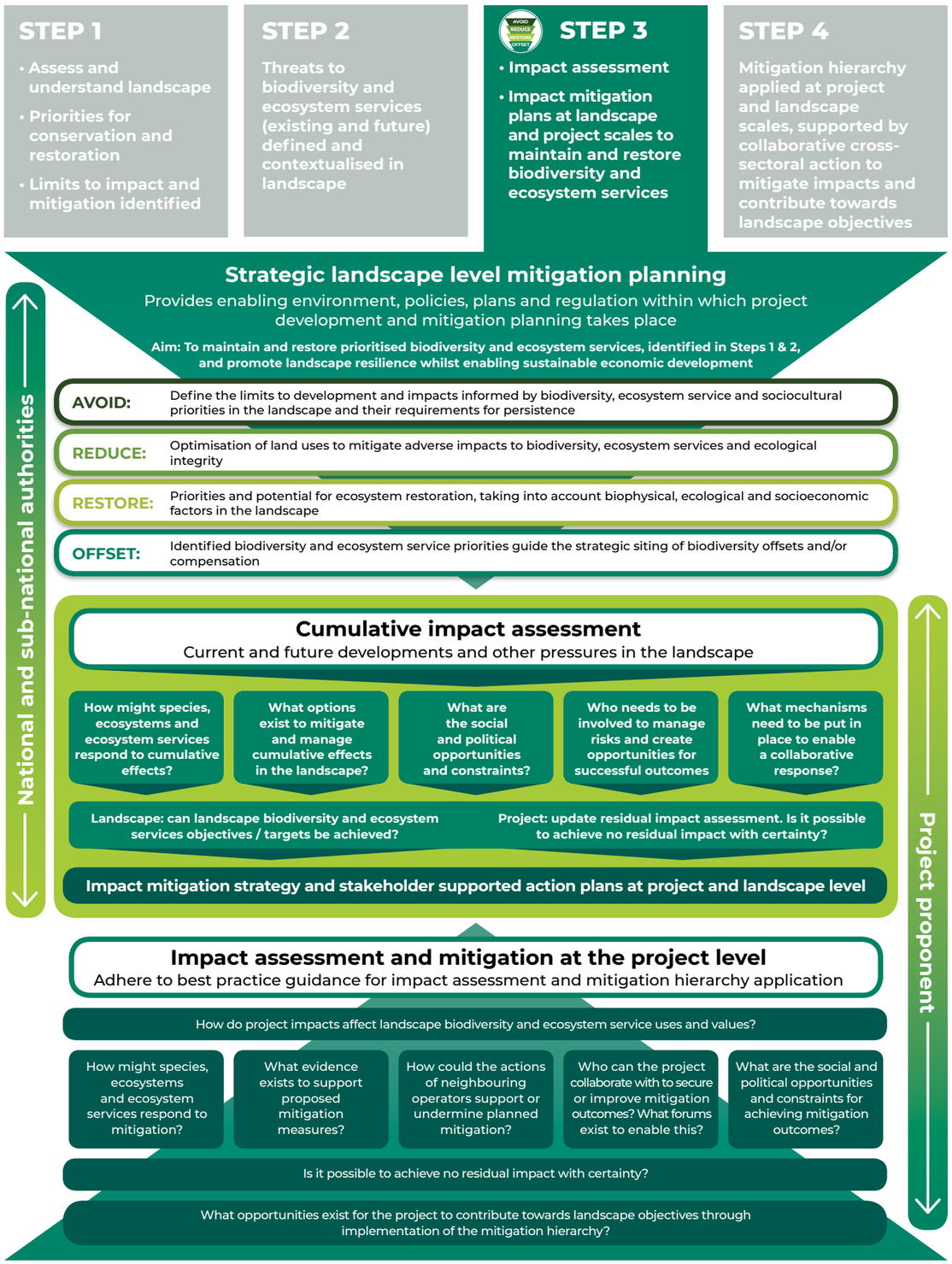


Figure 9 Main themes under Step 3

Credit: Juan Pablo Moreiras/FFI

Assessing pre-mitigation impacts in the landscape: cumulative impact assessment of all sectors

Here the focus is on proponents' direct and indirect impacts across multiple sectors and how these contribute to the wider cumulative impacts in the landscape. All actors have to consider the socioecological system as a whole (see illustrative example in Figure 10) and look beyond the fence to understand the likely impacts that could result from other activities or different sectors operating or planned in the landscape and to ascertain the possible cumulative effects in the absence of efforts to mitigate them. Particular attention needs to be given to those impacts that compound and cause ecological stress, species loss and loss of ecological function and ecosystem services, i.e. the theoretical worst-case scenario based on best available information. The implications for conservation priorities and landscape objectives validated through Steps 1 and 2 need to be assessed.

To support this, a table summarising some of the main impacts of each sector and their implications for generalised biodiversity features and ecosystem services has been developed (see illustrative example in Table 3 and see Supplementary Resource 'Impact Table' - details in Section D). This can be adapted, expanded and improved for use in specific landscape contexts. In its current form, the table allows the user to get an overall impression of possible impacts of different sectors and their common and distinct effects. This is something that can be challenging in standard project level impact assessment approaches, particularly in the case of cumulative impact assessments undertaken as part of the EIA/ ESIA process.

Where data are available or can be generated through an industry and stakeholder engaged process, this should be linked to the spatial assessment of impacts and cumulative effects. This can help build an understanding of how impacts may aggregate across spatial scales and in various parts of the landscape, and how they intersect with the conservation and restoration priorities identified in Step 1. The potential for spatial analysis to support our understanding of the cumulative effects of deforestation are illustrated in the Transboundary Landscape case study in West Africa (see FFI, 2021c).

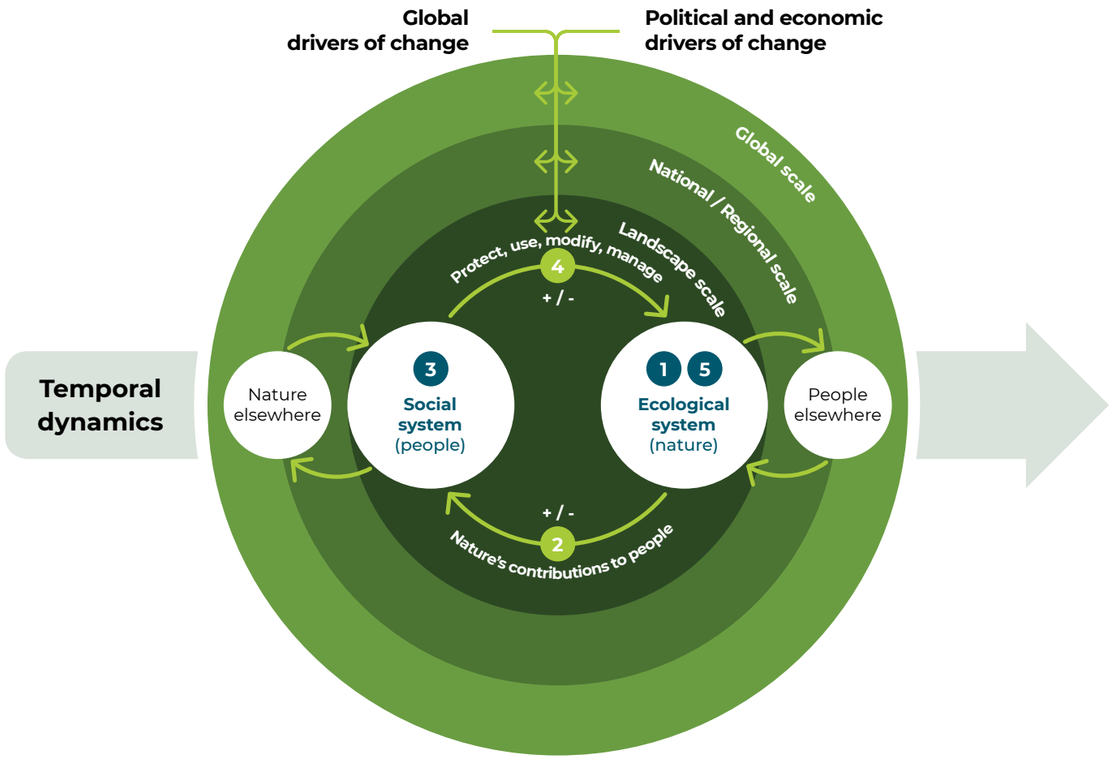


Figure 10 Understanding impacts from a socioecological systems perspective: An illustrative example

Example of an impact relevant to various sectors: clearance of ape habitat e.g. for production or infrastructure development (direct footprint) or as a result of people moving to the area attracted due to the presence of the development project (induced impact). The figure highlights: (1) potential ecological outcomes e.g. reduction in available resources on which chimpanzees depend; disturbance and displacement of chimpanzees etc., leading to (2) negative effects for people e.g. through crop raiding, resulting in (3) increased crop damages and negative attitudes towards chimpanzees. Changes in human attitudes and behaviour contribute to (4) escalating human-wildlife conflict with (5) heightened risk of injury or mortality to chimpanzee individuals/groups. This figure is a simplified example intended to highlight the interdependencies of socioecological systems and the knock-on effects that an impact can have throughout the system. In reality, wide-ranging factors will influence the effects of industry activities and consequences for interdependent socioecological systems.

Credit: Jeremy Holden/FFI

Table 3 Summary of some of the main impacts (direct and indirect) of each sector existing and anticipated in the Guinea Central Corridor (see also case study (FFI, 2021e)

Impact class approaches*	Biodiversity and ecosystem service receptors	Agriculture	Mining	Infrastructure	Hydropower	Urban Settlement	Rural Settlement
Clearance, degradation and fragmentation of natural habitat	Air Climate Habitat Soil Species Water	X	X	X	X	X	X
Soil compaction, reduction in soil quality and stability	Habitat Soil	X	X			X	
Noise pollution from operations	Species	X	X	X		X	X
Light pollution from operations	Species		X	X			
Operation induced injury/ mortality	Species	X	X	X	X		
Dust pollution from operational activities	Habitat	X	X	X			
Human-wildlife conflict	Species	X	X	X	X	X	X
Pollution of water resources	Habitat Species	X	X			X	
Restricted access to water resources	Species	X	X			X	X
Barriers to movement	Species		X	X		X	
Introduction and spread of alien and invasive species	Habitat Species	X	X	X	X	X	X
Exposure to disease	Species	X	X	X	X	X	X
Fire damage	Habitat Species	X	X	X		X	X
Altered drainage networks	Habitat Water	X	X	X	X	X	
Air emissions	Air Climate Species	X	X	X		X	

Key questions:

- What are the impacts that are common to multiple sectors and which are sector specific?
- How do impacts interact over temporal and spatial scales?
- What is the potential for cumulative effects and what opportunities exist for their mitigation?
- What are the implications of multi-sector impacts for socioecological systems (e.g. how might impacts on social systems influence natural systems and vice versa)?
- How will multi-sector impacts affect conservation priorities and delivery of overarching landscape objectives and targets?
- How will planned or proposed activities exacerbate existing known threats and pressures?
- How are priority species, ecosystems and ecosystem services likely to respond to multi-sector impacts and cumulative effects, taking into account their respective characteristics, current state and trends? How are their respective responses likely to differ?
- What are the implications for the people that depend on biodiversity and ecosystem services in different parts of the landscape? Are there multiple projects being developed or planned which may affect the same communities or cause critical thresholds to be reached that could compromise human rights? (I.e. in landscapes where multiple projects are planned, the same people are often affected.)
- What impacts are likely to compound and cause ecological stress, species loss and loss of ecological function and ecosystem services?
- Do we have sufficient knowledge about the ecosystem thresholds for resilience and health and how the impacts from different activities may undermine or threaten these in different ways?
- Do we know whether some industrial activities or sectors have lesser or greater impacts on different types of ecosystem and do they respond differently to different mitigation actions?

Landscape mitigation planning for biodiversity and relevant ecosystem services

Application of the mitigation hierarchy at the landscape level is premised on the fact that many impacts from development have wide-reaching implications for species and ecosystems, often beyond the immediate footprint of an activity, and contributing to cumulative effects in the landscape. Applying the mitigation hierarchy at a landscape level therefore takes into account the receiving environment at a system scale, integrates project level mitigation actions within broader (ecosystem-based) groupings and aligns the contribution of mitigation actions to landscape level issues, targets and outcomes.

Mitigation planning for the landscape builds on the outcomes of Steps 1 and 2 and responds to the need for mitigation hierarchy application at multiple scales, including the need for:

- landscape or jurisdiction-level identification of **strategic opportunities for, and limits to, mitigation** to support priority biodiversity and ecosystem service values and contribute towards landscape and/or national targets and objectives. This provides important input to integrated land use planning and SEA processes and, where it is done at national level and regulated, can guide project level impact assessment and mitigation planning;
- improved uptake and application of the mitigation hierarchy at project level across all sectors taking into account implications of mitigation actions on the wider landscape.

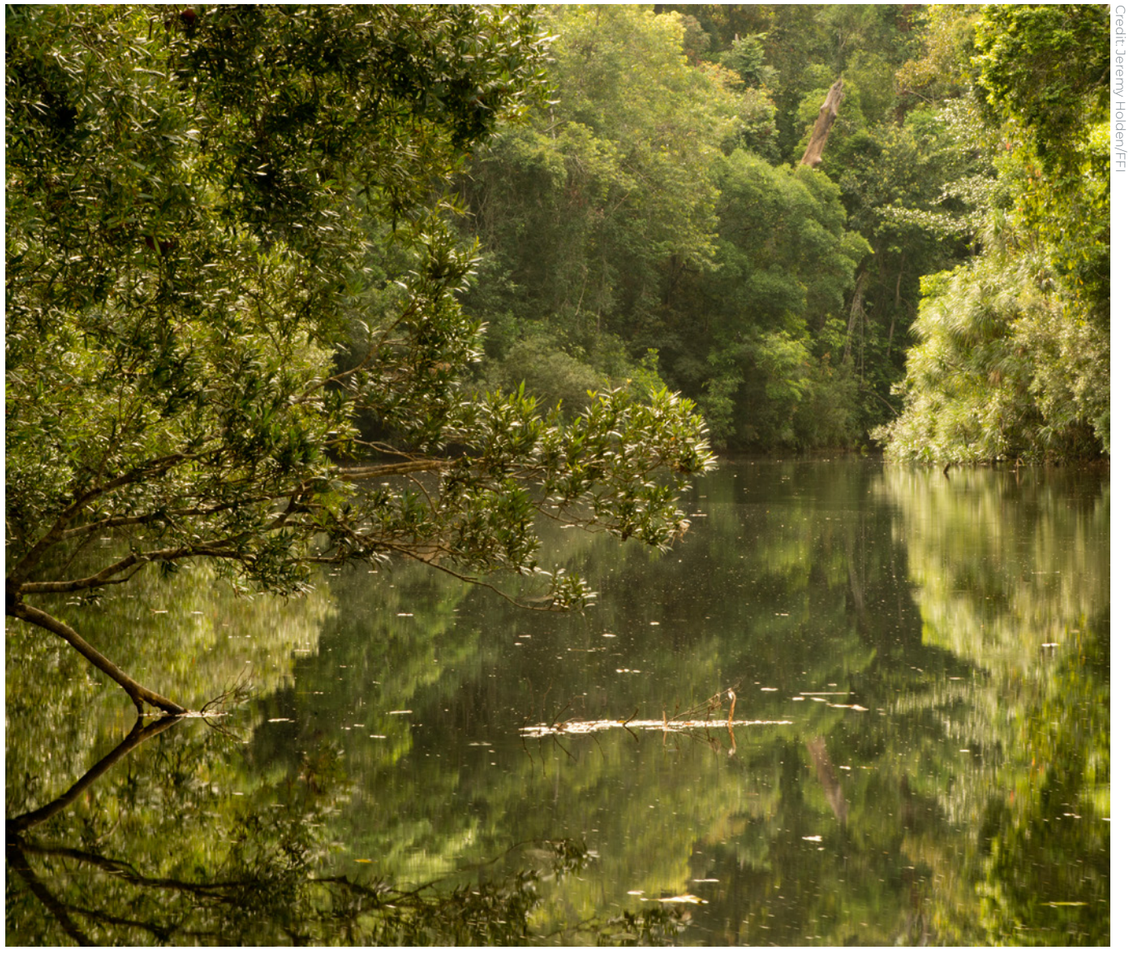
With an understanding of priority areas in the landscape for maintaining biodiversity and/or ecosystem services, Step 3 involves the identification of areas where:

- the **avoidance** of impacts is prioritised to maintain identified biodiversity and ecosystem service values in the landscape, stop irreversible and non-offsetable[8] impacts (e.g. defining 'no-go' areas), build resilience of ecosystems and biodiversity and ensure that essential stocks of flows of ecosystem services continue to be available e.g. only permitting land uses that are compatible with conservation, while others likely to have adverse impacts on biodiversity values should be avoided;
- impacts are **reduced and minimised** in the landscape through spatial planning to optimise land use and minimise the impact or trade-off with biodiversity and ecosystem service values (i.e. sectoral activities can be strategically sited within the landscape to achieve least harm outcomes, taking into account their ability to achieve no residual impact). This requires consideration of land suitability and condition, potential impacts of different industries/projects, their respective ability to fully mitigate their impacts with certainty, and how different biodiversity components and ecosystem services are likely to respond both to impacts and mitigation;
- there is **restoration** potential to meet landscape objectives by improving the extent, quality and connectivity of high biodiversity areas (e.g. species rich areas and/or those important for rare or threatened species) and areas important for the supply, flow and access to important ecosystem services (e.g. degraded or deforested riparian habitat important for connectivity and ecosystem services flows; degraded agricultural lands prioritised for restoration through the introduction of tree planting for agroforestry etc.). **Restoration must be determined to be feasible**, based on appropriate evidence and demonstrated success i.e. restoration techniques are proven in geographically and ecologically relevant contexts, supported by restoration experts and local stakeholders, and there is evidence of the technical and financial capacities for implementation. Where restoration of high value biodiversity and/or ecosystem services is not deemed feasible (e.g. where restoration techniques are unproven; where affected biodiversity or ecosystem services are of high value and/or are unlikely to respond to restoration in an appropriate timeframe) a **precautionary approach is essential** i.e. these areas should be a focus for the avoidance of impacts.

8. For more information and guidance on impacts that are not offsetable see: BBOP (2012c).

- At the landscape level, potential receiving areas for **biodiversity offsets** or ecological compensation can be identified to support the protection of priority biodiversity and/or the improvement of degraded or underrepresented biodiversity and the functions and services it provides. This can help to guide project level offset investments in a way that contributes towards securing conservation priorities in the landscape and can contribute towards meeting overarching landscape or national targets (e.g. by sizing them proportional to the respective residual impacts as well as the relevant targets), (BBOP, 2012b; Johnson, 2015; Simmonds et al., 2019). The **social dimensions to offsetting should always be considered** (BBOP, 2009b; Jenner & Howard, 2015; Bull et al., 2018). There may be trade-offs between biodiversity and ecosystem services (Box 6). **Limits to offsets** also need to be established (e.g. based on the value of the biodiversity and/or ecosystem services they support, the significance of impacts that cannot be mitigated and offset, and/or the likelihood of delivering successful outcomes), (BBOP, 2012c; IUCN, 2016). This informs the real need for avoidance in the landscape early on and helps to inform decision-making by both the regulator and the proponent (e.g. requiring the significant redesign of projects).

A Supplementary Resource 'Applying the mitigation hierarchy at the landscape scale: key differences between landscape and project application' provides an overview of the differences in applying the mitigation application at the landscape versus project scales (see Section D for details).



Credit: Jeremy Holden/FFI

BOX 6: CO-BENEFITS AND TRADE-OFFS BETWEEN BIODIVERSITY AND ECOSYSTEM SERVICES

Where biodiversity and ecosystem services are positively linked, synergies arise which support the delivery of co-benefits through an offset. Stacking and bundling are approaches that can be integrated into policy to facilitate the offsetting of ecosystem services, enhance the co-benefits and manage trade-offs between biodiversity and ecosystem services (von Hase & Cassin, 2018; Sonter et al., 2020). If synergies exist, it may mean that fewer offsets are required across a landscape to compensate for development losses, which might increase the management of such offset areas, increase the outcomes to both biodiversity and ecosystem services and secure priority areas under protection.

There are, however, important considerations when implementing offsets or compensation programmes that attempt to deliver co-benefits to both biodiversity and ecosystem services (Sonter et al., 2020). Often, there are no links between an offset implemented to counter-balance the impacts to biodiversity and any ecosystem service benefits, most commonly because the biodiversity associated with the offset is not correlated with the supply or support of an ecosystem services that stakeholders benefit from. There may be trade-offs between biodiversity and ecosystem services that emerge in the implementation of offsets, where biodiversity is negatively linked to the supply or benefit of an ecosystem services. For example, projects that preserve riparian vegetation which in turn decreases water availability for downstream beneficiaries, or where the benefits of an ecosystem service are impacted independently from their supply (for example, preventing access to an area due to land tenure changes). In such cases, it may be more effective to implement offsets that focus on the objectives for delivering gains in benefits of ecosystem services, or independent trades (Sonter et al., 2020). Either way, it is important to consider the potential trade-offs between biodiversity and ecosystem services when applying any stage of the mitigation hierarchy, especially offsetting.

The Cross Sectoral Biodiversity Initiative overviews important considerations and differentiation between the application of all steps of the mitigation hierarchy for biodiversity and ecosystem services (The Biodiversity Consultancy, 2015).

It is important that mitigation planning at this scale takes an integrated approach. Taking into account biodiversity conservation targets and objectives defined in Step 1 (e.g. no further loss, no net loss, net gain) and agreed ecosystem services objectives for non-industry beneficiaries as well as other relevant national or sub-national commitments and objectives (e.g. to achieve Land Degradation Neutrality, carbon emissions reductions, rural development objectives, food security etc.). In this way, the potential for synergies and opportunities for collaborations can be identified to build support for conservation action. Furthermore, overlapping interests, conflicts and possible trade-offs can be identified at an early stage and transparent and participatory dialogue and debate encouraged to find resolutions.

Consistent with other approaches, the framework promotes the **proactive contribution of industry towards landscape objectives (e.g. for biodiversity, water, climate, resilience etc.)** alongside and additional to impact mitigation. Taking a landscape approach helps to identify strategic priorities and objectives towards which operators can contribute (e.g. through the alignment of their respective strategies, plans and objectives, targeted actions, and investment). In combination, these actions form part of a broader objective to recover and protect ecological intactness and functionality with persistence for species across landscapes rather than small, isolated initiatives that are vulnerable or susceptible to failure due to their fragmented and uncoordinated nature.

With a clear idea now of the options in the landscape for avoidance and mitigation actions, and which activities are likely to achieve no net loss or net gain outcomes, users can start to explore solutions and pathways to achieve these outcomes:

- What are the **limits to mitigation opportunity** in the landscape and how does this need to inform land use planning and decision-making?
- Which industries/ activities have **least impact** on priority biodiversity and ecosystem services and/ or which are able to fully mitigate their impacts with confidence through robust application of the mitigation hierarchy? This helps guide the strategic placement of different land uses across the landscape to achieve least harm outcomes.
- What is the **potential of land that has already been heavily degraded or converted** to be utilised for economic activities and to support delivery of national policy priorities e.g. for rural development, food security or energy supply?
- What opportunities exist to **improve sub-optimally managed land to deliver benefits** to users (e.g. enhancing productivity through more sustainable management practises), whilst reducing pressure on high biodiversity value areas?
- Where might we expect **tensions** (competition and conflict as well as trade-offs or compromises) between biodiversity conservation, ecosystem services objectives and industry land uses to be greatest and how can this inform **pre-emptive action and collaboration/cooperation?**
- What opportunities exist to guide **industry investments in the wider landscape** to support overarching landscape or national objectives?

In this way, landscape mitigation planning provides important strategic guidance to inform development planning and decision-making at strategic and project/ site scales. **It establishes the rules of development:** where to go, where not to go; which impacts can and cannot not be tolerated; where there are compromises to make and what the potential trade-offs might be; where mitigation can and cannot support no harm, no net loss or net gain objectives etc. This can help to create a more level playing field for existing and new operators in the landscape - provided it is done at the national level and regulated – provide a suite of options in the landscape and help to strengthen the applicability and sustainability of project level mitigation actions. It can further guide and maximise the benefits of private sector investment towards landscape objectives.

Expanding uptake of the mitigation hierarchy and improving outcomes in the landscape

Mitigation planning at the landscape level is one part of the story and **landscape level interventions cannot be implemented in the absence of local, project level interventions**. De facto, all project proponents need to deliver the full mitigation hierarchy at the site or project level too, to prevent and mitigate impacts on biodiversity and ecosystem services. These should be additive where possible and designed to ensure that important biodiversity and ecosystem service values are maintained and delivered to achieve a stated goal (e.g. no net loss, or net gain) for specified biodiversity components and ecosystem services.

National policy and regulation are important drivers for the broader uptake and good practice application of the mitigation hierarchy at the project level across all development sectors. Though not directly addressed in this framework, the need for policy, regulation and institutional capacity to drive, enable and support mitigation hierarchy application is recognised as a critical enabler for outcomes at the landscape and site level (Box 7). Government has a crucial role to play in expanding the breadth of sectors and activities that fall under regulation, particularly in areas identified as important for supporting biodiversity and ecosystem services objectives. Corporate commitments and policy, conditions of finance, voluntary standards and certification schemes can also drive uptake and application.

BOX 7: CONSERVATION, IMPACT MITIGATION AND BIODIVERSITY OFFSETS: STRENGTHENING THE ENABLING ENVIRONMENT FOR MITIGATION HIERARCHY APPLICATION IN AFRICA

The framework seeks to complement and build upon other recent and ongoing or planned initiatives in the region, such as the 'COnservation, impact Mitigation and Biodiversity Offsets in Africa' project, hereafter the COMBO project[9]. With a focus on building capacity and strengthening relevant decision-making frameworks in Guinea, Madagascar, Mozambique and Uganda, the COMBO project worked with governments, development sectors, conservation organisations and other stakeholders to expand and strengthen the application of the mitigation hierarchy.

The activities and outcomes of the COMBO project in Guinea are particularly relevant to the application of the framework presented here. They provide an important foundation and ongoing programme to support the improvement of institutional capacity, policies and inter-ministerial coordination that are necessary to facilitate the uptake of this framework. For example, supported by the COMBO project the Guinean Ministry of Environment, Water and Forestry (MEEF) has defined six key principles central to Guinea's national strategy for the implementation of the mitigation hierarchy[10]:

- Improving the knowledge of biodiversity through updating and generating accessible data and information.
- Building upon existing regulation and decision-making processes by aligning with best practice approaches on implementation of the mitigation hierarchy.
- Integrating biodiversity and the mitigation hierarchy into policies across all sectors.
- Strengthening involvement and support of a wider range of stakeholders in the application of the mitigation hierarchy and decision-making frameworks.
- Using compensation requirements (i.e. biodiversity offsetting) to expand the protected area network and contribute to national restoration and biodiversity improvement objectives.
- Explore and strengthen the financial and technical capacity within the ministry and across stakeholders to ensure robust application of the mitigation hierarchy.

A road map to support the implementation of these principles and achievement of objectives has been developed and a number of strategic directions were identified and prioritised, including for example:

- Identification of existing regulations, laws and decrees for which the mitigation hierarchy can be integrated such as the commitment to the mitigation hierarchy in the Environment Code and the requirement for consideration in environmental and social management plans submitted according to impact assessments, applications and licensing requirements.
- Extension of the mitigation hierarchy to Local Development Plans and smaller projects not usually subject to impact assessment, to ensure that developments across all sectors are mitigating impacts and local decision-making processes are strengthened.
- Identification of areas of high ecological value that are priorities for conservation at the national level and promoting avoidance of impacts to these areas through integration in local planning processes, dissemination of information to all stakeholders (including donors, project developers and civil society) and establishing assurance mechanisms.
- Integrating commitments to sustainable development, equitable benefits and community rights into the laws and policies for the implementation of the mitigation hierarchy.
- Developing methodologies and approaches to the identification and implementation of compensation actions as part of the mitigation hierarchy, specific to the Guinean context.

Moving forward, the mitigation hierarchy and compensation approaches will be implemented under the regulatory and legal frameworks and national development plans across all development sectors in the country. There is a recognised need to develop partnerships and case studies to test and develop these required actions, including through pilot projects in priority landscapes. Opportunity therefore exists to pilot the application of this framework to contribute towards implementation of the national strategy and roadmap.

9. Funded by the Agence Française de Développement (AFD), the Fonds Français pour l'Environnement Mondial (FFEM) and the MAVA Foundation and implemented by the Wildlife Conservation Society, Forest Trends and Biotope between 2016 and 2019. Phase 2 of this work is likely to proceed in 2021.

10. Ministère de l'Environnement, des Eaux et Forêts, République de Guinée, Novembre 2019. Stratégie nationale pour la mise en œuvre de la hiérarchie d'atténuation et la compensation des impacts sur la biodiversité et les écosystèmes.

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The focus here is on ensuring that what happens at the site level is reflected in the context of the socioecological landscape and that mitigation is designed to deliver practical action and outcomes on the ground, is additive across projects, and aligned to wider landscape objectives. This requires analysis and improved understanding of incentives and barriers to impact mitigation by different sectors, the feasibility and effectiveness of different mitigation actions, and the opportunities and constraints for achieving mitigation outcomes.

Key questions

- What are the **incentives and barriers** for different actors in the landscape to mitigate their impacts in the landscape? Is there a regulatory or other driver (e.g. certification scheme or voluntary standard that is being applied)? How does this vary across sectors and scales?
- What are the **practical options** available to different sectors to avoid, reduce and reverse impacts?
- Are potential mitigation options **feasible** considering practical, technical and financial aspects? Is mitigation constrained by lack of opportunities (e.g. suitable land, ability to access or use it)?
- What other factors may influence the **ability of the sector to apply different mitigation options?** (E.g. knowledge of techniques, access to relevant expertise, capacity constraints, access to finance to implement mitigation measures, etc.)
- How can the application of the mitigation hierarchy be **socialised and incentivised** for unregulated activities, such as small-scale agriculture, particularly where it is not supported by a jurisdictional policy, cooperative or commodity certification?

The questions here, and in the section below, support an analysis of the context and the options, providing an inventory of mitigation hierarchy application across multiple sectors, including those for which the mitigation hierarchy may be a novel approach. The resultant mitigation table, demonstrated as a template in Table 4 (and see Section D), provides an illustrative, non-exhaustive list of possible mitigation options to avoid, reduce or reverse different types of impacts across multiple biodiversity features and ecosystem services and considers the potential response of receptors to mitigation actions.

Table 4: Biodiversity and ecosystem service responses and mitigation actions: an excerpt for a single impact example

Indicative applicability to industry / ability to implement mitigation action	Can the sector effectively and efficiently implement the mitigation measure to minimise the residual impact to the BES component?			Biodiversity and ecosystem services responses													
				How effective is the response or recovery of the biodiversity and ecosystem services component to the mitigation measures for each impact?													
				Impact	Mitigation hierarchy step	Mitigation action examples	Chimpanzee	Migratory bird (eg. Sanderling)	Habitat	Erosion control	Bio energy	Geo-thermal energy	Solar energy	Hydropower	Wind	Oil & gas	Mining
		Renewables		Clearance of natural habitat	Avoidance	Alternatives - Engineering solutions, operation plans, infrastructure planning, footprint design	Effective	Moderate	Effective	Limited	×	×	×	×	×		
					Avoidance	Forego/ sterilise mineral resource	Effective	Effective	Effective	Limited						×	×
					Avoidance	Avoid clearance of areas with high densities of fruiting trees	Moderate	Not applicable	Moderate	Limited	×	×	×			×	×
					Avoidance	Leave (reserve) trees or groups of trees in the harvest concession for regeneration purposes, and to provide nesting sites, food sources, cover, and travel corridors	Moderate	Not applicable	Moderate	Limited	×	×				×	×
					Minimisation	Establish buffer areas between areas cleared for project activities	Moderate	Not applicable	Moderate	Moderate	×	×	×	×	×	×	×
					Minimisation	Minimise the number of access and extraction roads	Limited	Effective	Limited	Moderate	×	×	×	×	×	×	×
					Minimisation	Appropriate timing and amount of natural habitat clearance	Limited	Effective	Limited	Moderate	×	×	×	×	×	×	×
					Minimisation	Sustainable harvesting practices that reduce collateral damage	Limited	Not applicable	Moderate	Moderate	×	×	×			×	×
					Minimisation	Allow canopy closure over roads and other linear clearings	Moderate	Not applicable	Limited	Limited	×	×	×	×	×	×	×
					Restoration	Restoration of natural habitat post-impact	Moderate	Effective	Moderate	Moderate	×	×	×	×	×	×	×
					Restoration	Reforestation to establish corridor function and improve connectivity between habitat patches	Moderate	NA	Moderate	Moderate	×	×	×	×	×	×	×
					Restoration	Early and progressive closure and rehabilitation of utilised land including revegetation and reforestation	Limited	Moderate	Moderate	Moderate	×	×	×	×	×	×	×
		Extractive															
		Infra-structure															
		Agriculture															
		Forestry															

Note: Supplementary Resources are available including 'Impact Table', 'Interim Table' and 'Biodiversity and Ecosystem Services Responses to Mitigation Table' which can be modified, adapted and tailored to the particular landscape context and can used to support the assessment of residual impacts (i.e. impacts that remain after mitigation measures to avoid, reduce, restore and compensate have been applied). See Section D for more details.

With this and additional, relevant information and input information regulators and proponents need to ascertain whether no harm, no net loss or net gain objectives can be achieved with certainty, taking into account the likelihood of a project, sector or combination of sectors achieving no residual impacts after the applying the mitigation hierarchy.

Mapping opportunities and constraints for delivering mitigation outcomes and contributing to landscape objectives in socioecological systems

Proposed mitigation measures need to be translated into practical actions that can be effectively implemented on the ground. This requires a view to the wider landscape and an appreciation of the social, cultural, economic, political and sectoral opportunities and risks to implementation (e.g. see Box 8).

BOX 8: THE IMPORTANCE OF MULTI-STAKEHOLDER LANDSCAPE APPROACHES TO ANTICIPATE AND MANAGE IMPACTS OF DEVELOPMENT ON WESTERN CHIMPANZEES

More than 80% of western chimpanzees are reported live outside high level protected areas (Heinicke et al., 2019b) and in diverse habitats including forest-agriculture mosaics (Hockings et al., 2015). For industry operators in landscapes that support western chimpanzees, mitigation actions targeting chimpanzees will need to consider a broad range of threats and pressures in the landscape and engage with stakeholders in areas outside of protected areas to anticipate impacts and find solutions to help ensure the long-term survival of the sub-species. For example, in areas where local residents have long-held traditions of not hunting chimpanzees the species has been able to persist outside of protected areas (Kormos et al., 2003; Heinicke et al., 2019c). However, when the development of large-scale infrastructure projects (mines, roads, railways etc.) causes influx of people from other areas, this can disrupt and undermine cultural norms with implications for the persistence of chimpanzees outside protected areas. Industry operators must engage with local stakeholders, other operators and authorities (formal and traditional) to better anticipate and find solutions to mitigate such induced effects, respect and support cultural norms and to manage and reduce hunting pressure (Kühl et al., 2017).

Mitigation actions designed to secure outcomes for biodiversity can positively or negatively affect some stakeholders more than others. Such social inequity can affect the likelihood of achieving mitigation objectives (Grantham et al., 2020). Stakeholder engagement is therefore essential to identify social, cultural, economic and political opportunities and constraints for applying different mitigation actions and to find solutions to overcome challenges. A range of techniques are available to support the integration of the social landscape into the process of identifying and prioritising options (see Section D).

Opportunities for partnerships with relevant stakeholders, including other industry operators, in the landscape to enable and support delivery of mitigation outcomes need to be identified and built into mitigation strategies to support their practical implementation. Cooperation and collaboration and the delivery of objectives designed to enhance the socio-ecological state of a landscape are essential and makes sense in terms of both a social license to operate and to generate efficiencies in management and mitigation of impacts to biodiversity and ecosystem services (see Step 4).

Enabling conditions, feasibility and effectiveness of mitigation:

Key questions

- **How will different species, ecosystems and ecosystem services respond** to different mitigation actions, taking into account their respective ecological requirements, current state, trends and other pressures? (see also Table 4).
- **Are proposed mitigation options proven** in the landscape? If so, where, by who, how and with what results?
- **What mitigation actions are already being applied** in the landscape and how can these be built upon to improve and broaden mitigation hierarchy application? What works and what does not, where and for which species, habitats or services? How have challenges been overcome?
- **How are mitigation interventions financed;** who bears the costs, what are the rewards, what innovative conservation finance models and mechanisms are feasible?
- **Who and what may influence the feasibility of mitigation** actions, likelihood of successful and durable outcomes (e.g. considering external factors (political, climate etc.), the actions and inaction of other operators, and possible unintended effects of impacts and mitigation action).
- **Who else is operating** in the landscape? What are their impacts and what are they doing to mitigate their impacts? How might the actions of one/some land users support or undermine the mitigation efforts of others?
- **Who needs to be engaged** in the design, delivery and monitoring of different mitigation actions?
- **Who to collaborate with** to help deliver, secure and strengthen mitigation outcomes? What forums or platforms exist to enable or support this?
- **What opportunities exist to positively contribute to landscape objectives** (biodiversity conservation, ecosystem service protection, restoration, water, climate etc.)? Are there any new or emerging landscape initiatives to engage in or align objectives to?
- What are the **implications of proposed mitigation actions for socioecological systems?** How could an improved understanding of the social and political landscape help to deliver and secure outcomes through mitigation?
- How **can co-benefits be optimised, trade-offs mitigated, and adverse outcomes avoided?**
- **Where are there compounding impacts** occurring within one biodiversity feature and/or ecosystem and how could these impacts result in a cumulative impact to the ecosystem services and benefits that stakeholders receive?

Information on mitigation options and the factors influencing their feasibility and effectiveness can be gathered from a variety of sources including, for example:

- Interaction with others operating in the landscape and evidence of mitigation results - what is working, what is not?
- Good practice guidance: this may be guidance developed nationally, or broader international or regional and sector specific guidance developed to improve mitigation and management of various types of impacts and in different ecosystem contexts.
- ESIA and SEA reports and published audits (where available) to validate progress in application, barriers/challenges and mitigation outcomes.

- Best available science and research demonstrating the effectiveness of various impact mitigation options for achieving intended outcomes for biodiversity and/or ecosystem services, as well as research piloting innovative techniques and approaches with potential to deliver improved mitigation outcomes (to be applied in a precautionary way until proven effective).
- Expert knowledge relevant to the landscape and affected species, habitats, ecosystem services and communities.
- Landscapes stakeholders, including relevant authorities (government and traditional), traditional ecological knowledge holders, affected communities, other land users (industry and non-industry) and NGOs/Community Based Organisations.
- Policy and legislative frameworks, to understand provisions for and constraints to mitigation within and beyond concession boundaries.
- National and subnational targets and commitments (e.g. to ecosystem restoration, or reduced deforestation) that can help to guide impact mitigation opportunities aligned with these broader targets.
- Strategies and reports that may provide insight into practical conservation and sustainable development methods and approaches that have proven effect.

Credit: Jeremy Holden/FFI

STEP 4
Applying the mitigation hierarchy across a landscape

Multi-scale, multi-sector application of the mitigation hierarchy to improve outcomes for socioecological systems and contribute towards landscape objectives

Individual, collective and collaborative action

Purpose: With stakeholder supported plans in place at project and landscape level (Step 3), the focus under Step 4 shifts to the critical yet challenging phase of implementing the mitigation hierarchy to deliver outcomes at the project and landscape scale, in turn contributing to national commitments and targets. Step 4 has two main purposes. First is to ensure the delivery of avoidance and mitigation actions in the landscape in an adaptive and coordinated manner, so that individual project actions work together to contribute to achieving sustainable outcomes for biodiversity and ecosystem services in the landscape. Second, is to deliver proactive avoidance and mitigation actions through collaborative and strategic application of the mitigation hierarchy at the landscape scale, ensuring appropriate structures and resources to enable collaboration are in place (see Figures 11 and 12).

Scale: Landscape scale, with individual and collective action at site and landscape scales.

Who needs to be involved: Both project proponents and national and sub-national government authorities will play a key role as lead, partner and active participant in the delivery of Step 4. Project proponents must deliver both locally and within the landscape whilst authorities provide the enabling environment and formal accountability for outcomes. Other actors (internal and external to the landscape) including civil society organisations, experts, multilateral agencies, and other industry operators or cooperatives who will play important roles in driving and delivering interventions should also be engaged and participate as appropriate.

Process: Step 4 is undertaken from both the project level and the landscape level – nesting one within the other. The project proponent must ensure local application of the mitigation hierarchy is reflected in the landscape and is contributing to ecosystem level objectives, whilst taking into account the cumulative implications of multiple project development on the ecosystem. Step 4 requires systematic review of activities, components, and spatial and temporal dimensions of mitigation interventions in the landscape and how they impact or affect ecosystems.

Stakeholder engagement is required to both validate, deliver and monitor delivery of avoidance and mitigation actions. In Step 4, appropriately structured and resourced partnerships and platforms for collective action and collaboration are established to support application of the mitigation hierarchy across all levels towards landscape objectives.

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Outcomes:

- Adaptive and ongoing application of the mitigation hierarchy improves biodiversity outcomes at project and landscape scales
- Partnerships and coalitions established and functioning to support delivery of mitigation action and progress towards landscape objectives.

Applying the mitigation hierarchy as a dynamic, adaptive and coordinated process

In Step 3, every effort is made to ensure that the direct, indirect and cumulative effects arising from regulated industry, unregulated human activities and other sources of threats and pressures in the wider landscape are considered in the development of project and landscape level mitigation plans. However, national, landscape and local conditions are dynamic over time and space, therefore, in practice the implementation of the mitigation hierarchy needs to be applied in a continuous, dynamic and adaptive process, which needs consideration in Step 4.

The steps of the mitigation hierarchy are applied simultaneously rather than as a sequence of actions, and need to respond to evolving conditions and issues, as well as responding to the results of earlier mitigation actions. At a project level continual mitigation hierarchy application should be throughout the lifecycle of the project (see Figure 11) and at the landscape scale addressed through future landscape level planning, decision-making and by adapting ongoing initiatives that are designed to meet landscape objectives.

If not explicitly considered, **changing threats and pressures in the wider landscape can have serious implications for the effectiveness of mitigation** efforts and may undermine the sustainability of outcomes for biodiversity and ecosystem services. Individual operators need to pay attention to what is happening in the wider landscape and respond accordingly in order for their own mitigation efforts to be effective. Considering:

- how existing threats and pressures change over space and time (e.g. increasing or shifting deforestation pressures) and implications for mitigation outcomes; and
- the role that new and emerging drivers of change in the landscape may play in supporting or undermining mitigation efforts (e.g. a new development project being approved, emergence of infectious disease, a new policy directive affecting landscape decision-making, a climatic event).

Monitoring, evaluation and clear documentation of how species, habitats, ecosystems and ecosystem services respond to interventions and adjusting management of mitigation plans and actions accordingly to prevent further impacts and secure outcomes is crucial both at project and landscape level (see Figures 11 and 12). Different actors will play different roles and influence outcomes at different spatial and temporal scales and it will be necessary to continually re-evaluate risks and opportunities for planned mitigation actions and for securing the outcomes of mitigation.

Figure 11 Continuous and adaptive application of the mitigation hierarchy in the context of the wider landscape is essential to secure durable and long-lasting outcomes.

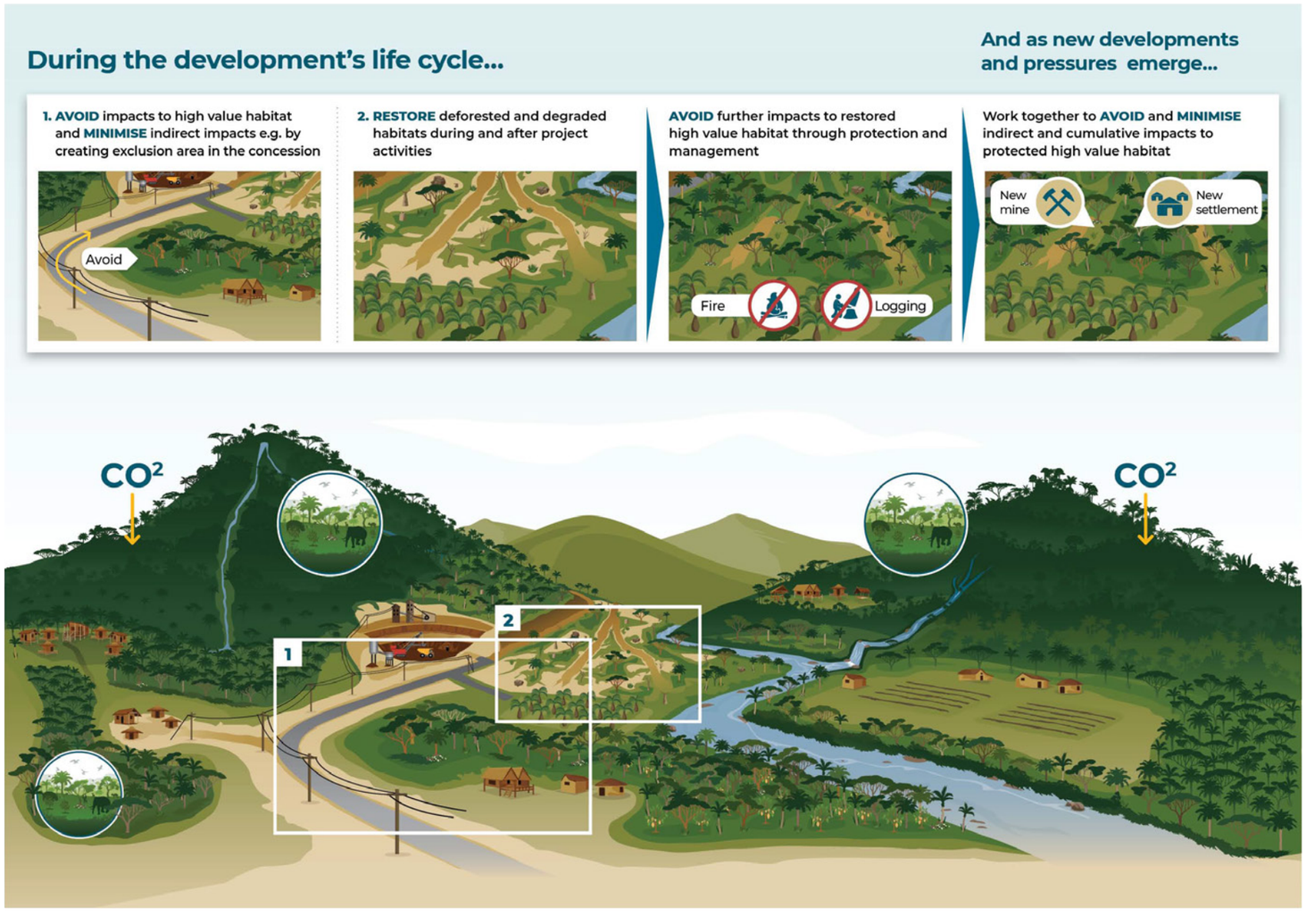

Figure 12 Contributing to landscape objectives through individual, collective and collaborative action

Adaptive application of the mitigation hierarchy requires coordination with other operators (within and among sectors) and proactive engagement with other stakeholders in the landscape, such that the outcomes of mitigation action are respected and secured. Failing which, the outcomes of one operator's mitigation efforts can quickly be undermined by the actions of neighbouring operators and land users (Case study 1). Dialogue with other operators and stakeholders can also bring to light new opportunities which can become an entry point for more strategic collective action and collaboration supporting both project and landscape level action towards landscape objectives.

Key questions to support the adaptive and coordinated application of the mitigation hierarchy in a landscape:

- Are site-level mitigation actions working? What challenges are being faced and how can these be addressed and approaches adapted to respond to successes and failures?
- Are there existing or new opportunities for collaboration and collective action?
- Who else is operating and planning to operate in the landscape? How might their activities, impacts and mitigation strategies support or undermine my mitigation efforts? How might this influence the cumulative effects across the landscape? What else might need to be done to avoid and mitigate these effects? Who needs to be engaged?
- What opportunities exist to add value to the mitigation measures applied by neighbouring projects to promote positive, durable outcomes?
- Are there conflicts or unforeseen consequences of mitigation actions unfolding that need to be addressed and mitigated?
- What opportunities exist to resolve these issues? Who needs to be engaged?
- How are changes (emerging or anticipated) in the social and political landscape likely to affect mitigation plans and outcomes? Could changes improve the enabling environment or create barriers and challenges for application?
- What opportunities exist for collaboration in financing mitigation measures and sharing the costs?
- Are there incentives for investment in the landscape that could help finance the cost of implementing the mitigation hierarchy through landscape planning and management, as well as specific mitigation interventions? For example, nature-based solutions or national level commitments to afforestation and biodiversity protection.

Collective action and collaborative approaches: drivers, roles, resources and lessons

Diverse entry points for motivating action

Collaborative delivery of solutions to the complex challenges of cumulative effects and landscape scale sustainability issues takes time and resources, and collaborative processes can be complex, challenging and long-term. The drivers and motivation for industry operators to engage in a collaborative process and commit resources to the landscape vary but are typically linked to their individual assessment of risks and opportunities.

Entry points to engagement include the need to secure water quality and supply, manage climate-related risks to operational activities (e.g. flood, drought, extremes in temperature etc.) and to fulfil commitments on emissions reductions, deforestation, reduced land degradation, ecosystem restoration, no net loss or net gain of biodiversity, mitigating social conflict, and supporting rural livelihoods and resilience (Scherr et al., 2017; World Business Council for Sustainable Development et al., 2017).

For example, assessment of operational impacts and dependencies on biodiversity and ecosystem services has stimulated some agribusiness companies to seek solutions beyond the fence and work with other land users at the landscape scale (see Case Study 2 and Case Study 3).

Objectives and targets set at national and subnational (landscape or jurisdiction) level (e.g. zero deforestation, net positive, etc.) can provide incentives for more coordinated landscape level action (FFI, 2018). Drivers for industry engagement will also be influenced by the sector, type and scale of the operation, its ownership (i.e. local, small- or medium-sized enterprise, a subsidiary of a larger company, or a multinational corporation), lifecycle/longevity of operation, and sources of financing (Heiner et al., 2017). This will also influence the scope and scale of engagement (i.e. consultation and sharing of information, through to shared decision-making and joint action).

Identifying common concerns or shared entry points for key stakeholders early in the process is important in motivating participation (Reed et al., 2020). Often a rapidly diminishing resource or landscape value (e.g. water, forest, great apes, pollinator populations), will serve as an entry point and can help to bring different actors together to better understand the issues, co-develop strategies to address them and accelerate collective action to manage such impacts through the mitigation hierarchy. For example, multiple concession holders coordinating to identify priority areas across their respective concessions where impacts need to be avoided and minimised to maintain contiguous habitat for threatened species, or shared use of linear infrastructure removing the need for additional road or powerline developments.

Demonstrating why collective action is needed and how it can create shared value for all stakeholders is important (Heiner et al., 2017). Where concerns for the loss of one or more resources are shared by many actors, catalysing collective action should be more readily achievable (Reed et al., 2020). For industry operators in forest landscapes, negligence or failure to manage risks relating to forests, water security, primates and other threatened species will have repercussions on project delivery. For example, unmanaged issues can slow projects down, may affect access to finance, causes conflict and controversy, costs money and increasingly may stop projects altogether. These types of issues often support the internal business case for engagement and investment beyond the business operations.

The risks that cumulative effects posed for individual operators delivering on their respective environmental and social commitments was the catalyst for mining companies coming together in the north-west of Guinea to create a sectoral platform to improve coordination and a collaborative response (see Case Study 1). Elsewhere innovative cross-sectoral partnerships have been formed to manage potential induced impacts linked to project development (see Case Study 4).

It is in the interests of all industry operators to come together and to engage with other land users and regulators, to foster inclusive coalitions and partnerships, share responsibility, and deliver joint action to mitigate risks, spread the investment needed and make a positive contribution into the landscape.

The roles of different actors in collaborative landscape processes

A pivotal role for industry

Industry operators need to play critical roles in collaborative landscape processes to address complex sustainability issues. Some may take a catalytic or leadership role. Activities include initiating, building and supporting partnerships and networks of landscape actors, driving landscape level planning processes, lobbying for policy change (as part of the collaborative network), developing collaborative initiatives, supporting joint studies and data sharing and co-funding interventions to promote sustainability in the landscape and address shared risks (e.g. see Case Study 2; Case Study 5). Others have important roles to play as active participants in collaborative platforms and processes, or by aligning their respective activities with identified aims of the collaborative platform and defined landscape objectives (FFI, 2018).

The role of government and other actors

At the national level, government responsibilities are often organised around different sectors, and it is important to ensure that all relevant government agencies are engaged. Government typically plays an important role in any collaborative landscape process, whether as the driver and lead (e.g. Case Study 6; Case Study 7) or in a partnering and participation role at local, regional and/or national levels. In contexts where inter-ministerial forums already exist, this can provide an important means for engaging with relevant government agencies. In Guinea, for example an inter-ministerial committee – the National Committee for Compensation of Impacts on Biodiversity and Ecosystems (CN-CIBE) – was established by decree in 2017 under the Chairmanship of the Ministry of Environment, Water and Forests and comprises representatives of all sectors of the economy. In Namibia, the government responded to calls for action from industry and civil society by establishing an Inter-ministerial Steering Committee to govern the delivery of a strategic landscape level environmental management plan for the Central Erongo Region (also see Case Study 5).

Depending on the systems that are governing land and resources in the landscape, local governments and traditional authorities will be important partners in landscape level collaborative processes and delivering action on the ground as they have a direct stake in the outcomes (FFI 2021c; Heiner et al., 2017). Depending on the spatial scale of the process this may involve one or more local governments, and many traditional authorities.

Other actors can also play a pivotal role in catalysing and facilitating processes to initiate and improve communication, coordination, and collaboration among stakeholders and to help identify strategic priorities and partnership opportunities that will help enable industry operators to deliver effective mitigation of impacts and contribute positively towards landscape objectives. This may require the brokering or establishment of a multi-stakeholder platform that provides the structure and institutional governance between the parties. This can be done by third parties to the process, including an institution (existing or new) specifically established to undertake this function. The involvement of relevant government entities in these processes is important.

Monitoring progress and achievements at the landscape level (e.g. towards landscape targets or objectives) is key to being able to communicate how your activities relate to improvements in landscape sustainability. This can be important at the local, landscape, national and broader global scale (e.g. to shareholders and consumers) (see Case Study 8).

Mobilising investment for landscape-scale initiatives

Industry, government, civil society and donors play a key role in providing finance and other in-kind resources (such as human or physical resources) to enable landscape initiatives to be implemented. Taken together as a whole, investments from a variety of sectors can contribute to multiple landscape objectives. A report in 2020 by EcoAgriculture Partners (Shames & Scherr, 2020) calls for a move away from ad hoc project-by-project investments towards a robust integrated landscape finance system in order to successfully mobilise resources that generate economic, social and ecological benefits and realise landscape objectives. They present the following key elements required of such a system:

- **Investment readiness at the landscape scale (beyond project level investment readiness):** This involves supportive long-term policies such as land tenure, financial incentives from the public sector for sustainable investment, and local financial institutions that support landscape sustainability objectives.
- **A robust pipeline for a portfolio of investable projects:** This starts with the collective development of the long-term landscape vision, action plan and the identification of individual investment ideas that contribute to the landscape objectives which can be delivered by individual developers such as government, companies and entrepreneurs. Developers may need support with business planning and appropriate financing.

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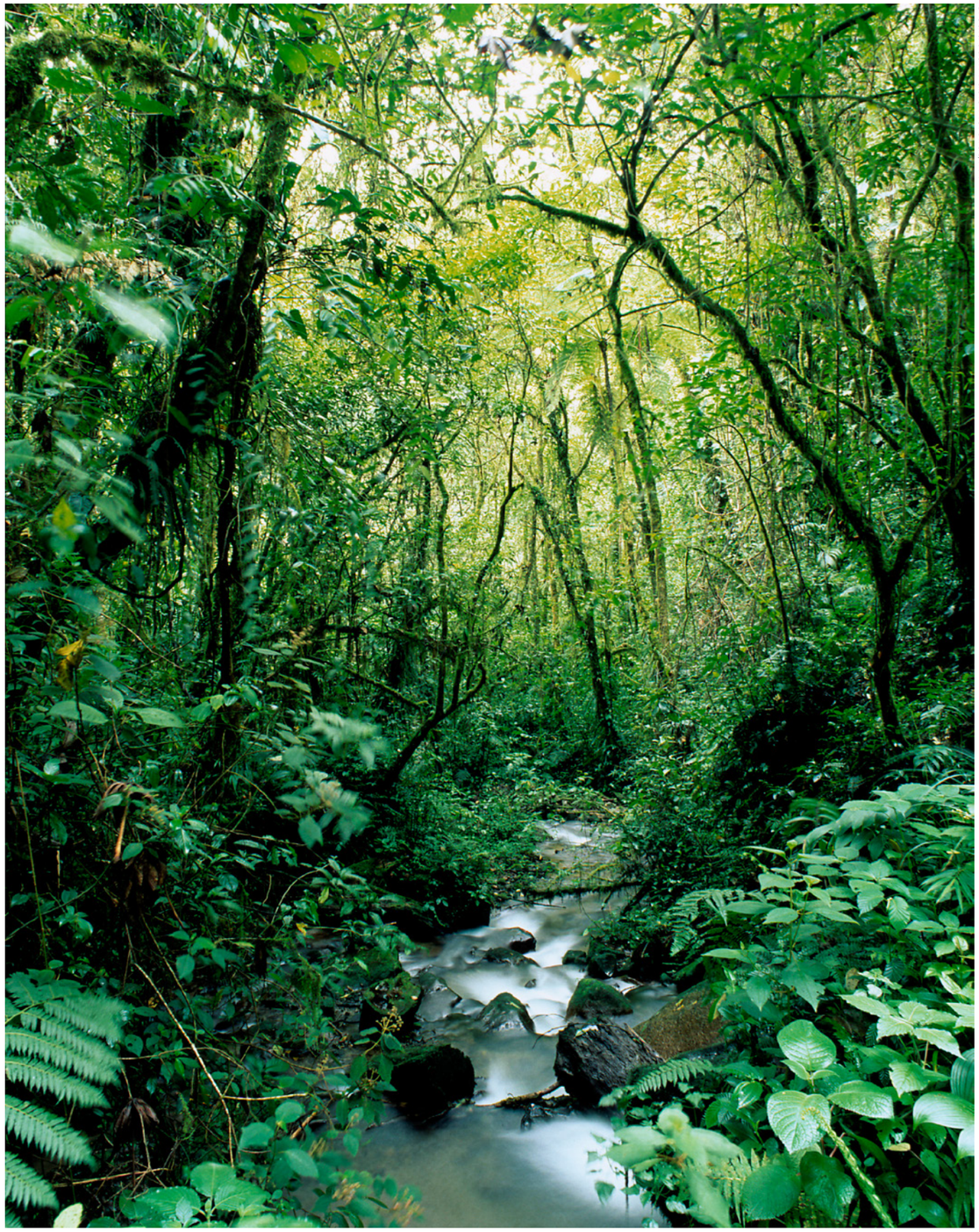
- **Accessible sources of finance with appropriate deal structures:** The availability of appropriate and accessible finance sources and deal structures is important. Deals need the appropriate structure, size, time horizon and risk to return to suit the diverse financial institutions and actors who may fund landscape investments, including:
  - private investors (individual farmers, local banks, institutional investors, and companies) want primarily to generate attractive risk-adjusted financial returns;
  - impact investors expect financial, social and environmental returns;
  - public and civic sector, including local / national government, NGOs, foundations, international public finance institutions (including the World Bank) provide enabling investments to fund landscape level activities. Often these are for profit.
- **Mechanisms to coordinate financing of the investment portfolio:** This is the requirement for a mechanism to coordinate and connect projects in the investment portfolio with suitable finance sources. There are roles for both government programmes to coordinate public sector projects, and public-private partnerships have had successes. Innovations aimed at aligning the many public, business and civil society projects on a broad scale are recently emerging.

For more information see Shames & Scherr (2020), the report provides detailed information to enable understanding of integrated landscape finance, as well examples of major innovations and models emerging in the field, in order to inspire further innovation by landscape partnerships, service providers for landscape finance, developers of landscape finance vehicles, and investors.

Over the last decade, the term **nature-based solutions** has gained traction as an umbrella term for a number of different ecosystem-based approaches with “actions to protect, sustainably manage and restore natural or modified ecosystems, addressing societal challenges (e.g. climate change, food and water security or natural disasters) effectively and adaptively, while simultaneously providing human well-being and biodiversity benefits” (Cohen-Shacham et al., 2016). These include ecological restoration, green infrastructure, ecosystem-based management, protected area management and others. They can provide an approach to practical actions to be considered when applying the mitigation hierarchy, provide the focus for investments in a landscape, but also in some cases provide mechanisms to generate long-term sustainable financing (Figure 12). They are also currently attractive to international donors interested in funding projects with multiple benefits to a landscape. Examples include:

- Reducing Emissions from Deforestation and Forest Degradation (REDD+, in which the “+” signifies the role of conservation, sustainable management of forests and enhancement of forest carbon stocks), (Case Study 10);
- responding to potential induced and cumulative effects by investing in ventures that generate sustainable livelihoods whilst deflecting pressure from sensitive forest habitat and species (Case Study 4);
- working with local communities to establish forest-based enterprises and inclusive green financing instruments;
- establishing strategic partnerships between private sector, government, civil society organisations and local communities to realise opportunities for habitat restoration and enhancement to improve biodiversity and carbon values (Case Study 10);
- promotion of silvopastural systems - that combine trees, forages, and shrubs with livestock operations in a form of agroforestry practice – to support ecosystem restoration. In parts of Latin America, the implementation of such silvopastural systems has contributed to reduced deforestation, lower levels of fire and pesticide use, improved forage and animal productivity, biodiversity benefits, and increased carbon sequestration (Mauricio et al., 2019).

A global standard and guidance for operationalising nature-based solutions has been developed by IUCN (IUCN, 2020a, 2020b) and given the interest in this area, many more examples of successful application of nature-based solutions will be generated in the coming years.



Credit: Juan Pablo Moreiras/FFI

Lessons learned for advancing effective collaborative processes

Whilst there is no single formula or approach, a growing body of experience can help to guide the development and evolution of a collaborative process (Gross & Wertz, 2015; Heiner et al., 2017; Scherr et al., 2017; FFI, 2018; Reed et al., 2020):

- Identify **common concerns or shared entry points** for key stakeholders at the outset
- Identify **existing collaborations, networks and coalitions** that could provide a basis for action or a partnership structure upon which to build
- Identify **investments needed** in the short and longer term to prepare and enable stakeholders to participate
- Identify and engage with **individuals that have passion and commitment** – they can be instrumental in motivating others and sustaining landscape collaborations
- Design specific activities to **build trust** and address stakeholders' concerns, and invest time in building on pre-existing **relationships** and developing new alliances
- Establish a **pre-competitive dialogue** where operators feel safe sharing data, information and challenges
- Support and enable **locally driven processes** in which a landscape vision and objectives are stakeholder-defined
- Use of **independent facilitation** can help to enable a constructive process
- Strengthen **links between higher and lower level actors** to prevent further entrenchment of pre-existing inequalities and injustices
- **Clear and demonstrable benefits** of participation, in the short and long term can help motivate and sustain engagement
- Ensure that multi-stakeholder processes **formally influence decision-making** to ensure continued relevancy and stakeholder engagement
- Understanding and **engaging with policy and local-level government is essential** and can be a strong entry point for dialogue processes. Where policy issues present barriers to achieving objectives (e.g. through misalignment of sectoral policies) pathways forward need to be identified.
- **Designating and fully supporting an employee or representative** to engage regularly in the collaborative process and/or platform is important
- Finding and **building on synergies** with other existing targets, programs, initiatives and processes gives the best chance of success, traction, replication and longevity (Case Study 2).

For practical guidance on establishing landscape coalitions and private-public-civic partnerships see "Public-private-civic partnerships for sustainable landscapes: A practical guide for conveners" and Section D.

Case studies showcasing multi-stakeholder and multi-sector collaboration applying mitigation actions towards landscape objectives in action

This section provides examples that capture a variety of different approaches, drivers, and contexts of multi-stakeholder and multi-sector collaboration that are relevant to applying the mitigation hierarchy towards landscape objectives. Further examples are provided in the separate focal landscape case studies (Barry, et al., 2021, FFI, 2021c, 2021d, 2021e).

Case study 1: Establishing a multi-operator platform to improve coordination and manage cumulative effects of mining in north-west Guinea

Over the past decade, there has been rapid growth of the bauxite mining industry in north-west Guinea. Today, the Boké region is host to at least 14 companies at different stages of mining activities and the accelerated increase in bauxite production is having wide-ranging impacts on forests, biodiversity and people. In this increasingly crowded landscape, addressing the indirect and cumulative impacts of mining is a major challenge.

"In the absence of collective action to mitigate and manage impacts, the region risks becoming uninhabitable after bauxite mining. Efforts must be made today to coordinate actions and build a better life in Boké now and into the future."
Dr Penda Diallo (Camborne School of Mines, University of Exeter)

In this busy multi-operator landscape the actions of one operator can quickly undermine mitigation efforts of neighbouring operators. For example, western chimpanzees utilise habitat that extends across the boundaries of adjacent mining concessions. Maintaining the integrity of chimpanzee habitat and the long-term survival of the chimpanzees that depend on it will require concerted and coordinated effort by all concession holders. Thus, there is an urgent need and opportunity in this landscape to work together to reinforce and improve mitigation outcomes if operators work together.

The sectoral platform, Réseau Environment Bauxite, was formed in 2018, following recognition among biodiversity managers at the Compagnie des Bauxites de Guinée and Guineé Alumina Corporation that to meet regulatory and lender requirements, it would be necessary to go beyond the boundaries of individual mining concessions to consider and integrate the impacts of neighbouring operators and other land users.

"Collaboration is the only sustainable way to manage cumulative impacts"
Mamadou Samba Barry (Unité de Coopération pour l'Offset Moyen-Bafing, Guineé Alumina Corporation)

Reconciling mining companies with very divergent interests and obligations towards a common vision and agenda and securing the voluntary commitment of operators to implement shared objectives and activities has proved challenging. Yet despite being in its infancy, the platform has already helped to break down barriers between operators: building trust, facilitating a more open dialogue, improving understanding of common interests and issues and enabling the sharing of biodiversity data and action plans.

"Nowadays, all the signatory companies of this network speak the same language and others want to join."
Mamadou Samba Barry

The platform has also enabled collaboration between members in addressing impacts and challenges in mitigation, and in seeking co-funding for a collaborative conservation programme.

This case study emphasises the value of industry-led development of a multi-operator platform to respond to recognised challenges that cannot be addressed by any individual operator alone. It further highlights the importance of establishing trust between members in order to overcome barriers to communication, information sharing and joint working.

Source: Barry et al., 2021

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Case study 2: From single sector to multi-stakeholder watershed management in Lombok, Indonesia

British American Tobacco has operated through a local subsidiary in Lombok for over 30 years partnering with almost 3,000 smallholder farmers every year. The local operation (PT Export Leaf Indonesia (PT ELI) until 2015 and currently PT Bentoel Internasional Investama Tbk) adheres to the British American Tobacco Group sustainability policies. Watershed degradation and deforestation of native forests have contributed to water resource crises in Lombok resulting in water shortages and flood events, and threatening food security through impacts on agricultural production. A major driver of watershed degradation and deforestation has been the increased extraction and use of woodfuel (not primarily by the tobacco sector), exacerbated by weaknesses in forest protection and management.

The British American Tobacco Group has been instrumental in catalysing and actively supporting a landscape approach to watershed management in Lombok; a process that began with the company's corporate commitment to assess and address its impacts and dependencies on biodiversity and ecosystem services globally. Through this process two high risks were identified in Lombok: unsustainable wood fuel sourced from neighbouring islands as well as Lombok used for drying tobacco (impact) and water catchment degradation reducing the water supply for agriculture (dependency). Corporate vision and Group performance targets, including the removal of native forest use for curing, coupled with financial and technical support stimulated local action by PT ELI and partners towards an integrated approach to watershed management, rehabilitation of headwater degraded forests and innovation in the development of alternatives to unsustainable woodfuel use. The aim was to improve the functionality of Lombok's watersheds through sustainable land management practises at three stages along the watershed that enhance biodiversity and ecosystem services, support agriculture and improve livelihoods and resilience. A long-term Biodiversity Partnership between British American Tobacco and three international NGOs technically supported the vision and its delivery through local implementing partners.

Through a landscape-level, multi-stakeholder process, in which PT ELI was an active stakeholder at local and provincial level, a 15-year Integrated Watershed Management Plan for the water catchment was developed and subsequently integrated into local regulations governing spatial planning as well as District development plans, thereby enabling and enforcing implementation. A watershed forest management unit was also established, formally recognised and eligible for national government funding to improve forest management for the benefit of biodiversity and watershed services. Scaling up of sustainable land management practises has further been advanced through the establishment of community agroforestry demonstration sites. Sustainability has been a central tenet of planning processes with a strong emphasis on building capacity, promoting partnership and networks, embedding watershed management into policy and regulation, and securing sustainable financing (e.g. through a payment for ecosystem services scheme called Plan Vivo).

Source: Lyons, 2014; FFI, 2018

Case study 3: Agribusiness catalyses a multi-stakeholder landscape response to mitigate risks and manage the continued supply of ecosystem services

The productivity of coffee crops relies on biodiversity and environmental conditions (e.g. pollination, soil conditions, water availability and climatic conditions) to yield high value products. Changes to water quality and flows, pests and diseases, habitat loss, soil erosion and changing climatic conditions can adversely affect production. These ecosystem services flow in and out of a farm or plantation area and throughout the wider landscape. They are also subject to a range of threats both within and beyond the fence line.

Credit: T photography/Shutterstocks

In 2013, the IUCN, Nespresso and a local NGO, Instituto Pesquisas Ecológicas, worked together to better understand the company's dependencies on ecosystem services, their potential impacts to these services and how other users in the landscape also depend on and impact ecosystem services in the Cerrado biome in the state of Minas Gerais, Brazil. The project identified the ecosystem's ability to provide clean water as a primary issue of concern, which not only affected the coffee value chain, but also the landscape as a whole, including rural communities and their diverse set of socio-economic activities. The Corporate Ecosystem Services Review methodology (Hanson et al., 2012) and the Biodiversity Risk and Opportunity Assessment tool were utilised to assess risks and dependencies and to develop action plans in collaboration with stakeholders.

Ecosystem delivery of fresh water was fundamental to all stakeholders and the need for a coordinated approach was identified, stimulating the formation of a collaborative platform involving other business and community users of these ecosystem services. A management plan has since been initiated to identify priority areas for restoration and ecosystem conservation, and to coordinate activities of different stakeholders with the aim of mitigating risks and protecting the future supply of ecosystem services. It took almost two years to get the consortium up and moving towards collaborative activities, but since then it has served as a valuable catalyst for action in the region for improved land and water management. This example highlights the value of tools (particularly quantitative assessment tools) in engaging private sector actors and the need for patience and long-term engagement.

Source: IUCN, 2015; Heiner et al., 2017; FFI, 2018

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Case study 4: Cross-sectoral collaboration between mining operations and agribusiness motivated by complementary interests and objectives

In multi-use landscapes, a major challenge is how to improve the integration of smallholder agriculture and larger industry to meet their respective objectives. How can agribusiness be designed to support regenerative agriculture, be socially inclusive with minimum land ownership, and support environmental objectives in the landscape? ImpactAgri is a for-profit venture that brings together major companies, investors and stakeholders, to establish agricultural enterprises with secure market access that are socially inclusive with active participation of local farmers and communities and environmentally sustainable.

Securing seed financing presents a major challenge yet also an opportunity to partner with extractives operators. For a mining company, the indirect social and environmental impacts of the mine being present in the landscape (e.g. inducing in-migration to sensitive areas around the mine) present a major challenge that is often far greater than the impacts of the mine footprint itself. Mining companies have social and environmental commitments and must manage the risks posed by induced and cumulative effects and maintain their social license to operate.

ImpactAgri's model offers a potential solution that can deliver on multiple objectives for the mine, whilst meeting the needs of local communities and a growing population (and associated demands on food production). The model emphasises the importance of setting up businesses that are socially and financially viable over the long-term. Agribusinesses are established as stand-alone ventures, designed to meet commercial and environmental parameters, so that they can thrive over the long-term - independent of and beyond the lifetime of a mine. Environmental considerations are built into the design process from the and there is a strong emphasis on soil management, agroforestry and clean energy processing solutions. Building the value add to existing crops produced in the landscape is an important component of business design with the aim of delivering multiple benefits (e.g. processing shea butter using renewable technologies that reduces dependencies on woodfuel, and delivers benefits for human health, forests and biodiversity).

In the context of ape landscapes, this model may prove critical in helping to balance the multiple threats facing apes and their habitat with the needs of rapidly growing human communities and a national drive for sectors such as mining to catalyse economic development in other industries. For example, the strategic siting of socially inclusive agribusiness can help to draw human activity away from the mine and away from areas that are important for biodiversity and other ecosystem values (e.g. forests with high biodiversity and carbon value, protected areas, wildlife corridors, headwaters) by providing an attractive, sustainable and resilient livelihood option. The promotion of agroforestry-based farming systems can further support the regeneration of degraded lands, provide longer-term business opportunities for communities, and contribute towards food security, climate and biodiversity objectives.

Source: ImpactAgri, Pers. comm. 2020; impactagri.com

Case study 5: The Namibia Strategic Environmental Assessment and Strategic Environmental Management Plan: From grass roots to inter-ministerial steering committee

The Uranium Rush in Namibia peaked in 2007, when uranium prices reached a high of USD 136/lb U_3O_8, with a surge in demand for large numbers of exploration and mining licences near and even within the Namib Naukluft National Park, one of Namibia's flagship protected areas. As an important tourism destination, and with tourism rapidly becoming a significant contributor to national Gross Domestic Product, the rapid expansion of mining in the Central Namib fueled conflict amongst different land users. A call for proper planning with regard to sustainable development and biodiversity loss was voiced from multiple sectors.

Led by Rossing Uranium, a Rio Tinto mine committed (in those days) to a net positive impact on biodiversity, four mining and five exploration companies came together to establish the Health, Environment and Radiation Safety (HERS) Committee, with objectives to protect the reputation of Namibian uranium and manage the environment and social risks associated with uranium mining development. The HERS Committee invited members of the local, regional and national authorities, and local scientists and NGOs to join their working groups, tasked with the development of best practice guidance for all industry members to ensure uranium sold from Namibia was responsibly produced. Representation from both the Ministries and Mines & Energy and Environment & Tourism ensured communication channels opened, facilitated by the Chamber of Mines and the external affairs department of the mining companies, whose focus on reputational risk facilitated the acknowledgment of the grassroots development of voluntary principles for good practice in the absence of strategic direction and regulation from government. Membership by private sector interests in uranium was mandatory.

Taking these issues seriously, a SEA was completed 2008-2009, commissioned by the Namibian Ministry of Mines and Energy to investigate the impact of the Uranium Mining "rush" in the Erongo Region. The idea was conceived by the Ministry in collaboration with the Chamber of Mines, and was supported by the German government and the Geological Survey of Namibia. Alongside the SEA, a Strategic Environmental Management Plan (SEMP) was produced, with the delivery governed by a newly formed, fit-for-purpose SEMP Steering Committee, comprised of an inter-Ministerial cohort from eleven Ministries to ensure representation from all facets of the Namibia socio-economic and political interest. To balance this with private sector and non-governmental voice, the Chamber of Mines and one mining company were given seats, as were two NGOs – one local and one international.

Building on recommendations from the SEA for Namibia's Uranium Province, a Landscape Level Assessment (LLA) of key biodiversity vulnerability and land use in the Central Namib was commissioned by Namibia's Ministry of Environment and Tourism in April 2011. The aim was to strengthen the information base for biodiversity and ecosystem services in order to support more integrated land use planning and decision making in the Central Namib, that take the relative importance of biodiversity and ecosystem services across the landscape into account. FFI led this assessment in collaboration with Anchor Environmental, Forest Trends, EnviroMEND, Gobabeb Training and Research Centre and the University of Hamburg (Jenner et al., 2012) .

The LLA strengthened the SEMP, providing a unique opportunity to provide genuine strategic direction to the uranium industry in the central Namib. The SEA brought together a collection of projects, each being conducted by individual companies however, collectively producing significant cumulative impacts, with areas of concern including loss of 'sense of place', over-abstraction and pollution of groundwater, short and long term radiation exposure of workers and the public, stress on physical and social infrastructure and opportunity costs on other, more sustainable industries.

The SEA was not only a regional Development Plan, but provided a landscape overview and pathways to avoid antagonistic and cumulative impacts, as well identify opportunities to enhance and protect biodiversity in the landscape. It also enabled collaboration between operators in the industry to achieve a common approach towards long-term management and monitoring – in some cases well beyond the life of individual mines (e.g. biodiversity, aquifer monitoring, tailings maintenance, etc.) both now and into the future.

Sources: Jenner et al., 2012. P. Howard, Pers. comm. 2020.

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Case study 6: Bringing supply chain actors together to address deforestation from cocoa production in Ghana

Ghana's Cocoa Forest REDD+ Programme (GCFRP) is a government led initiative in which the Forestry Commission and Ghana Cocoa Board have been working with private cocoa buyers to leverage international climate finance and advance a national development and conservation vision. The aim is to halt deforestation and forest degradation whilst realising the positive contributions of the cocoa sector towards national social and economic development. The national Joint Framework for Action further recognises a significant role for the cocoa sector in the restoration of forests and resilient landscapes. The GCFRP has been accepted into the World Bank Forest Carbon Partnership portfolio with the aim of generating emissions reductions across a 6 million ha landscape and securing zero deforestation supply chains in Ghana and Cote D'Ivoire.

The GCFRP landscape has been defined according to the ecological boundaries of the high forest zone and aligns with the country's main cocoa production landscape. The initial focus for implementation will be on identified 'Climate-Smart Cocoa Hotspot Intervention Areas' within the production landscape. The GCFRP aims to reduce deforestation and forest degradation through a landscape level, climate-smart cocoa production approach, that is reliant on multi-stakeholder collaboration and landscape management plans that include identification of areas to be avoided by cocoa production activities and other land uses (i.e. no further deforestation or degradation).

To work, it depends on the engagement of hundreds of smallholder producers. Thus, the benefits of their participation have to be clear and demonstrable. Guidelines for on-farm and off-farm practices and activities are aimed at increasing yields and incomes, contributing to climate mitigation, and enabling adaptation and resilience. A local advisory committee, chaired by Ghana's Cocoa Board, brings together buying companies, end-user companies, producers, and NGOs who meet quarterly and examine different issues.

Over time it is hoped that other land users will be brought into the process, including timber and mining industries. In adopting a phased approach, scaling up and expanding to additional sectors over time, the process is being tested and demonstrated. In turn, this may help build the business case for others to get involved.

Sources: Asare & Gohil, 2016; Mason et al., 2016; Fishman et al., 2017; Republic of Ghana Ministry of Land and Natural Resources, 2017; Asare, 2020

Credit: Foto Stellanova/Shutterstocks

Case study 7: Delivering landscape level objectives through public-private partnerships

West Kalimantan has made a commitment to environmentally and socially sustainable development in the region. This is a major production area for agricultural commodities including palm oil and coconuts, in addition to a large pulp and paper industry, which combined represents approximately 45% of land area in the province. With large tracts of extant forest, peatland and mangrove under threat of continued deforestation, the province has realised that an integrated approach amongst all land uses and stakeholders is required in order to reach their sustainable development goals.

A public-private partnership between IDH Sustainable Trade Initiative and PT CUS (part of Pasifik Agro Sentosa group, the biggest land user in the region) was convened by the Governor in May 2016. PT CUS and other businesses are meeting commitments to a production-protection-inclusion model of forests on their concessions which has to date seen 30% (circa 10,000 ha) of plantation area set aside for conservation. This integrated approach considers and integrates community groups in the protection and management of forests, whilst also sharing benefits with business through regulation compliance, improved monitoring frameworks, new sustainable ventures (such as renewable energy projects), commodity security (including fire prevention measures) and improved productivity.

The West Kalimantan green growth strategy aims for the protection of 120,000 ha of high conservation value forest, in addition to the rehabilitation of 10,000 ha, in which the PT CUS commitments are contributing greatly to this.

Sources: IDH, n.d., 2016; FFI, 2018

Credit: rdt.radhan/Shutterstocks

Case study 8: Monitoring sustainability performance of landscapes and landscape partnerships

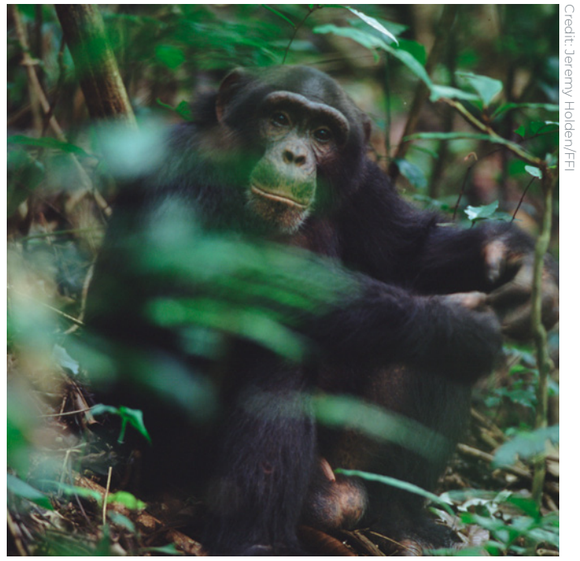
Credit: Anna Lyons/FFI

The shift in the need for accountability and rising expectations from the finance sector and consumers of better practices by all industrial players within complex landscapes has been a contributing factor in the development of LandScale. This is a new assessment approach that seeks to provide an impartial, holistic and globally recognised system for assessing the cumulative effects of activities in landscapes dominated by natural resource-based industries (e.g. agribusiness, forestry, extractives, tourism) and tracking progress towards more sustainable and resilient outcomes. Companies, industry initiatives, governments, financial institutions, NGOs and donors working at the landscape level can use LandScale to measure the sustainability status of a landscape, track trends, inform decision-making, and credibly communicate impact.

Assessments can be conducted by a single entity, a group interested in developing a collaborative landscape initiative, or an existing multi-stakeholder landscape partnership. The assessment framework itself comprises a set of goals related to improvements in ecosystem health, human well-being, governance and production of key agricultural and forestry crops. These are underpinned by indicators and performance metrics to help measure critical aspects of landscape sustainability status and trends. Guidelines, a verification mechanism and an online reporting platform have been developed or are underway. An optional 'Sustainable Landscape Partnerships' Module has been designed to help multi-stakeholder groups at any stage of their development to report their activities and progress in a structured manner in relation to five key elements of integrated landscape management.

For more information see: landscale.org

Case study 9: Mining companies work together to aggregate their biodiversity offsets and create a new national park to protect western chimpanzees in Guinea



Credit: Jeremy Holden/FFI

In the Boké region of Guinea, Compagnie des Bauxites de Guinée and Guinea Alumina Corporation are bauxite mining companies with adjacent concessions. Despite the application of the mitigation hierarchy, both projects have residual impacts on the IUCN Red List Critically Endangered western chimpanzee, and both are required to comply with lender safeguards – in this case the IFC Performance Standard 6. This has been an important driver for collaboration between the two companies and the aggregation of their offsets.

By working together, and in partnership with the government of Guinea, the Wild Chimpanzee Foundation, and IFC, the companies have aggregated their offsets to create the Moyen Bafing National Park – located some 200 kilometres east of the mine sites – where approximately 4,400 chimpanzees can be safeguarded. Together, these mining companies have committed very significant finance (amounting to USD 48 million) to establish the park and to support chimpanzee conservation activities in the park. This is particularly notable given the lack of public funding or other alternative sources of finance. Following an extensive informed consultation and participation process, in September 2020, it was reported that communities have approved the boundaries of the Moyen-Bafing National Park reinforcing the legitimacy of the park.

Securing the permanence of the Moyen Bafing National Park will deliver benefits for a wide range of species including the West African lion recently rediscovered in the park. The creation of the park makes a significant contribution to the Government of Guinea's national target to increase the extent of the protected areas and, by securing important forest habitat, will contribute to climate mitigation objectives.

Collaboration and strong partnerships, in this case between operators and with government, NGOs and financial institutions, have proven crucial in moving an offset scheme through the complicated set up process to where it is now. Collaboration will continue to be important in addressing remaining challenges for the park including the reconciliation of the needs of human communities and forest conservation (e.g. through zoning of land uses within the park based on demographic, socio-economic, and biodiversity data) and management of the risks posed by major development projects in the vicinity of the park so they do not undermine its viability.

Sources: Wild Chimpanzee Foundation & Office Guinéen des Parcs et Reserves (OGuiPar), 2017; World Bank, 2019b, 2019c; Wild Chimpanzee Foundation, 2020

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Case study 10: Oil & gas sector contribution to the development of Niassa REDD+ rangeland farming initiative to protect carbon and wildlife and secure ecotourism assets for additional income and economic growth.

Mozambique is a country located in south-east Africa. Natural forest covers 43% of the country, with forests playing an important role in the economy of the country, especially in the rural areas. They provide direct benefits to a large majority of the population as a source of energy through the extraction of firewood and charcoal, construction materials, logging for timber, non-timber forest products (medicinal plants, fruits, etc.) and as a source of nutrients for small-scale agriculture.

The third National Forest Inventory reports findings estimated that forests in Mozambique have suffered high rates of deforestation, estimated at 0.58% or 220,000 ha/year.

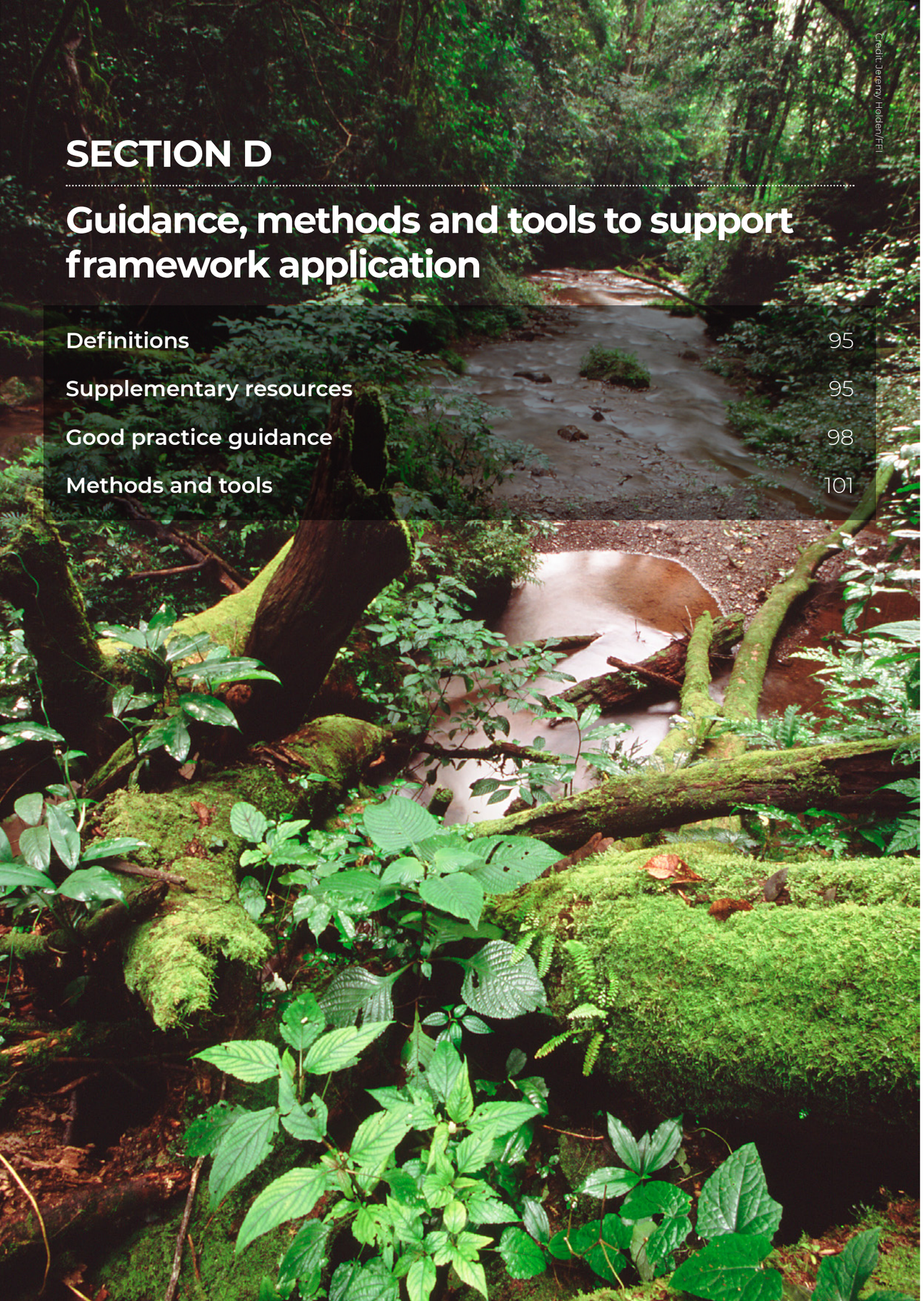
Acknowledging this situation, and understanding its impact to the economy and to the livelihood of rural populations, the Government of Mozambique became part of the 47 countries that benefited from Forest Carbon Partnership Facility funds to develop the National REDD+ strategy. Alongside this, Mozambique is establishing a National Forest Monitoring System and the Forest Reference Emission Level / Forest Reference Level of greenhouse gas emissions for REDD+.

Niassa Special Reserve bordering Tanzania, Niassa is the largest conservation area in Mozambique. Covering 42,000 km^2 it is also one of the most extensive wilderness areas left in Africa, comprising 31% of Mozambique's protected land. Niassa is part of the Eastern Miombo woodlands ecoregion, and the reserve is one of the largest miombo woodland preserves in the world. In 2012 Chuilexi Conservancy was formed from five adjoining tourism concessions within Niassa Reserve (>700,000 ha), managed by an international NGO. The Chuilexi blocks of Niassa hold the highest densities of wildlife in the reserve.

The carbon potential of Chuilexi is attractive to the decarbonisation strategy of energy sector majors, who envisage using carbon credits generated by REDD+ forest protection and conservation projects to offset part of a company's direct emissions. A number of such private sector companies have strategies that involve the development of REDD+ projects with high environmental and social value. Such projects aim to reduce deforestation and/or forest degradation, and thereby avoiding carbon emissions whilst also preserving and protecting biodiversity, and ensuring social benefits for local populations.

Essential to progress such projects is collaboration with e.g. the Ministry of Mineral Resources and Energy to work on sustainable development and decarbonisation projects and MITADAR, the Ministry in charge of environment and protected areas. Areas of cooperation could include Emissions Reductions, fostering conservation and sustainable management of forests, and enhancement of forest carbon stocks, within the framework of REDD+ initiatives, e.g. through large forestry projects generating carbon credits.

The private sector's contribution to such landscape level projects includes funding REDD+ project feasibility studies to assess emissions reduction potential by avoiding deforestation and forest degradation, and promoting conservation and enhancement of existing carbon stocks through sustainable management of natural resources and the implementation of sustainable agricultural and livelihood activities. In the case of Niassa, all the proposed REDD+ project activities would stimulate local livelihood generation, added revenues to local communities from carbon credit transactions, enhanced security for the protected area and increased tourism. The projects would link reducing deforestation with the promotion of sustainable, alternative land uses for the local communities and the long-term effective management of two key sites within Mozambique's Protected Area network, thus achieving national and local objectives.



Credit: Jeremy Holden/FFI

SECTION D

Guidance, methods and tools to support framework application

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Guidance, methods and tools to support framework application

Definitions

Users of this framework are referred to the following resources for additional definitions of technical terms: UNEP-WCMC's Biodiversity A to Z website for technical terms relating to biodiversity and ecosystem services. https://www.biodiversitya-z.org/themes/terms

Denier, L., Scherr, S., Shames, S., Chatterton, P., Hovani, L., Stam, N. (2015) The Little Sustainable Landscapes book. Global Canopy Programme, Oxford for definitions relating to landscape and landscape approaches.

Business and Biodiversity Offsets Programme (BBOP). (2012) Glossary. BBOP, Washington, D.C. 2nd updated edition for technical terms relating to biodiversity offsets.

Supplementary resources developed for the framework

Whilst the framework largely makes use of existing methods and tools to support application of the framework, as outlined later in this section. Several resources have been specifically developed by the project to support Step 3 and are available from the FFI website:

Case studies

In-depth case studies have been developed to help illustrate key themes within the conceptual framework. The case studies are based primarily on desk-based research, supported input from in-country staff and partners, and where possible through interviews and engagement with relevant stakeholders. Some of the case studies showcase existing approaches that have proven effective and can help to inform and support the implementation of aspects of the framework, whilst others highlight how and why framework application would be beneficial. All case studies are available in English and French.

Case studies focus on multi-use landscapes in West and Central Africa that are both priorities for ape conservation and recognised for their high biodiversity and ecosystem service values. Each focal landscape is at a different stage of development and with varying combinations of sectors operating and/or proposed. Case studies include the following:

1. **Gabon: Industry leadership and multi-stakeholder collaboration to mitigate impacts to high biodiversity values**

   The Gabon landscape centres around the Gamba Complex of Protected Areas in south-west Gabon and was selected because it is a landscape where the actions of leading individual companies (in forestry, oil & gas and palm oil), as well as a number of collaborative initiatives, have aimed at achieving the coexistence of industrial development alongside the persistence of high biodiversity values. Industry leadership and collaborative action are themes encouraged within the conceptual framework and this landscape therefore provides examples that can inform and support framework application elsewhere. In contrast to focal landscapes in West Africa, the landscape is important for both western lowland gorillas and central chimpanzees and therefore provides an opportunity to consider how these two ape species, with very different sociobiology, respond - both to the impacts of different sector developments, and to actions taken to avoid, mitigate or remedy those impacts.

2. **Guinea Central Corridor: Cross-sectoral engagement to mitigate transformational landscape development**

   The Central Guinea landscape was selected as an emerging transformational development landscape in the Central Corridor of Guinea, in West Africa, considering complex multi-use ape landscapes and where pressure from concurrent developments on social and natural systems is intensifying or anticipated. Associated with two major bauxite concessions around the towns of Mamou and Tongue, the proposed developments include railway links to a new port to the south east of Conakry and potentially to Simandou, hydropower, and commercial medium- and large-scale agriculture development. The area is currently under-developed and very rural, with a great deal of natural habitat, which includes known populations of IUCN Red Listed Critically Endangered western chimpanzee. The landscape also encompasses the recently declared Moyen-Bafing National Park. Opportunity exists, therefore, to try to inform decision-making at an early stage in the development of this landscape.

3. **Transboundary (Guinea, Liberia, Sierra Leone): Opportunities and challenges for maintaining a connected forest landscape in the face of development pressures**

   The Upper Guinean Forest Transboundary Landscape centres on the Guinea, Liberia and Sierra Leone borders and encompasses transboundary forests such as the Mount Nimba Strict Nature Reserve and UNESCO World Heritage Site and the Ziama-Wonegizi-Wologizi-Foya forests. These and other forest patches across the landscape support rare and threatened species, including forest elephants and the IUCN Red Listed Critically Endangered western chimpanzee, and are important for maintaining the continued supply and flow of essential ecosystem services. Multiple sectors (agriculture, forestry, mining, infrastructure and energy) are already operating but the landscape is expected to face intensifying pressure as a result of planned large-scale mining projects and associated transport infrastructure which is designed to catalyse economic growth in other sectors and improve access to the region. Together with rapid human population growth, a growing agricultural sector, and road development and enhancement programmes the potential for significant cumulative impacts on biodiversity and communities is high. The case study focuses in on the Guinea Forestière part of the landscape, where several large mining projects are planned, and considers opportunities and challenges for cross-sectoral application of the mitigation hierarchy across the landscape.

4. **Boké, Guinea. Challenges and opportunities for collaboration to address the cumulative effects of mining: a multi-stakeholder perspective from Guinea**

   The Boké prefecture in north-western Guinea contains some of the world's largest reserves of high-grade bauxite. This mosaic landscape also hosts important natural habitat that supports threatened, rare and restricted range species including the western chimpanzee and West African red colobus, maintains essential ecosystem functions and services, and holds important cultural value. Though the region has a long history of mining, over the last decade mining activity has increased rapidly with extensive and wide-ranging impacts for biodiversity and for communities. The focus of this short case study is the recently established sectoral network, the Réseau Environment Bauxite, which formed in response to growing concerns by some mining operators of the cumulative impacts of bauxite mining in the region. This case study brings together experience and learning from the creation and operation of the network that can help inform the application of the Framework, particularly Steps 3 and 4, and development of sectoral and cross-sectoral platforms or networks elsewhere in the region.

Applying the mitigation hierarchy in complex multi-use landscapes in Africa

Background papers

Provide additional, more detailed review on relevant key topics, available in English only:

- FFI (2021) Applying the mitigation hierarchy in a complex world. Background paper: Multisectoral development in Africa and implications for biodiversity and ecosystem services. Fauna & Flora International (FFI). Cambridge, UK.
- FFI (2021) Applying the mitigation hierarchy in a complex world. Background paper: Current approaches for mitigating and managing the impacts of development. Fauna & Flora International (FFI). Cambridge, UK.

Supplementary resources

- **Applying the mitigation hierarchy at the landscape level: Key differences between landscape and project application.** A resource highlighting key differences between landscape and project level application of the mitigation hierarchy, including the types of actions for each step, influential stakeholders and benefits of application. Available in English and French.
- **Impact table (Excel):** A table that provides an overview of the different biodiversity, ecosystem service and socioecological components that might be impacted by different sectoral activities. The table provides a high-level overview of the different impacts that may be occurring or possible in a landscape, taking into account multiple sectoral developments and biodiversity and ecosystem services components and considering direct and indirect effects and the accumulating impacts of multiple projects. It can be used to help consider the applicability of the main mitigation hierarchy steps (avoid, reduce, restore) relative to the impact and contributing activity. This table is a working example and serves as a template in which variables and information can and should be updated and expanded if applied to reflect the sectors and impacting activities, biodiversity, ecosystem service and socioecological components and conditions that are relevant to the landscape. Available in English only.
- **Interim table (Excel):** A matrix table that provides an overview of the suite of impacting activities across the spectrum of different sectors combined with the associated impacts and the biodiversity and ecosystem service receptors. This table helps to link the 'Impact table' with the 'Biodiversity and ecosystem services responses to mitigation' table to help identify the impacts and the activities that might cause the impact. Available in English only.
- **Biodiversity and ecosystem services responses to mitigation table (excel):** A table that captures the effectiveness of mitigating actions for different impacts, taking into consideration the ability for impacted biodiversity or ecosystem services to respond to mitigation as well as the ability of different industrial and small-scale sectors to effectively implement each mitigating action. It helps to overview the suite of mitigating actions available to help prevent, reduce and reverse impacts, considering multiple biodiversity features and ecosystem services in the landscape and their unique responses to mitigation actions, as well as the relevance of the impact and mitigating action for each sector. This table is a generalised, working example, that acts as a template in which variables and information can and should be updated, expanded and refined in application to reflect the sectors, biodiversity, ecosystem service and other socioecological components and conditions that are relevant in the landscape. Available in English only.

Communications products

- **Animations:** Two animations are available in English and French on the FFI youtube channel introducing the following topics:

  - *What is a socioecological system? (English version / French version)*

  - *Avoiding and mitigating the impacts of development through collective and collaborative action (English version / French version)*

- **A mitigation hierarchy for farmers.** Infographic highlighting key questions that can guide a farmer to avoid and reduce impacts on biodiversity values and seek opportunities for restoration. Available in English and French.

Good practice guidance

Application of the framework is supported by a wide range of existing good practice guidance, methods and tools. Some illustrative examples of good practice guidance are included here to support framework implementation and to highlight the wide range of resources that are available to support users in applying the framework. The list of resources included here is not intended to be comprehensive or exhaustive in any way. Users are advised to consider the most appropriate guidance, methods and tools for their respective landscape contexts and application focus. Some resources are currently available in English only; others are available in French and other languages.

Guidance is relevant to framework application in general (across all steps) unless otherwise stated.

Stakeholder engagement, multi-stakeholder processes, and landscape partnerships

Anderson, P. (2011) Free, Prior, and Informed Consent in REDD+: Principles and approaches for policy and project development. RECOFTC – The Center for People and Forests Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

Brouwer, H., Woodhill, J., Hemmati, M., Verhoosel, K. & van Vugt, S. (2015) The MSP Guide. How to design and facilitate multi-stakeholder partnerships. Centre for Development Innovation of Wageningen University & Research: Wageningen, The Netherlands.

Food and Agriculture Organisation (FAO) (-) Stakeholder analysis. Food security for action practical guides. FAO: Rome, Italy.

FAO (2014) Respecting free, prior and informed consent: practical guidance for governments, companies, NGOs, indigenous peoples and local communities in relation to land acquisition. FAO: Rome, Italy.

Gross, L. & Wertz, L. (2015) The landscape approach for sustainability in African agribusiness. Partnerships that support excellent companies, communities and ecosystems. EcoAgriculture Partners: Washington DC.

Heiner, K., Buck, L., Gross, L., Hart, A. & Stam, N. (2017) Public-private-civic partnerships for sustainable landscapes: A practical guide for conveners. EcoAgriculture Partners and IDH, the Sustainable Trade Initiative.

International Finance Corporation (IFC) (2007) Stakeholder engagement: A good practice handbook for companies doing business in emerging markets. IFC: Washington, DC.

Kusters, K., de Graaf, M. & Buck, L. (2016) Guidelines – Participatory planning, monitoring and evaluation of multi-stakeholder platforms in integrated landscape initiatives. EcoAgriculture Partners, Washington DC.

LandScale (2020) Sustainable landscapes partnership module

Reed, J., Barlow, J., Carmenta, R., van Vianen, J. & Sunderland, T.C.H. (2020) Engaging multiple stakeholders to reconcile climate, conservation and development objectives in tropical landscapes. In J. Reed, M. Ros-Tonen and T. Sunderland (eds.) Operationalizing integrated landscape approaches in the tropics. Center for International Forestry Research.

Stockholm resilience Centre. Wayfinder: A resilience guide for navigating towards sustainable futures. The following module is particularly relevant to building landscape coalitions: The Wayfinder Guide (Building a Coalition for Change module)

Volkman, S., Petroy, E., & Lee, M. (2020) Leveraging the power of collaboration. The SustainAbility Institute by ERM.

A sample of available methods and toolkits to support good practice stakeholder analysis and engagement, multi-stakeholder processes, and landscape partnerships and collaborations are included in the Table 5 and below.

Taking a landscape approach

General guidance and resources

Chatterton, P., Ledecq, T. & Dudley, D. (2016) Landscape elements. Steps to achieving Integrated Landscape Management. Guidance Brief. World Wildlife Fund.

Denier, L., Scherr, S., Shames, S., Chatterton, P., Hovani, L., Stam, N. (2015) The little sustainable landscapes book. Global Canopy Programme: Oxford, UK.

FAO (2012) Voluntary guidelines on the responsible governance of tenure of land, fisheries and forests in the context of national food security. FAO: Rome, Italy.

FAO (2017) Landscapes for life: Approaches to landscape management for sustainable food and agriculture. FAO: Rome, Italy.

Kozar, R., Buck, L.E., Barrow, E.G., Sunderland, T.C.H., Catacutan, D.E., Planicka, C., Hart, A.K., and L. Wil¬lemen. (2014) Toward viable landscape governance systems: What works? EcoAgriculture Partners, on behalf of the Landscapes for People, Food, and Nature Initiative: Washington, DC.

LandScale Assessment Framework and Guidelines Version 0.2

Metternicht, G. (2018) Land Use and Spatial Planning: Enabling Sustainable Management of Land Resources. Springer Briefs in Earth Sciences. Springer International Publishing.

Reed, J., Ros-Tonen, M. & Sunderland, T.C.H. (2020) Operationalizing integrated landscape approaches in the tropics. Center for International Forestry Research.

United Nations Convention to Combat Desertification (2020) Supporting the Global Response to the COVID-19 Pandemic: Land-based Solutions for Healthy People and a Healthy Planet. UNCCD.

Watson, E. (ed.) (2020). High Conservation Value (HCV) Screening: Guidance for identifying and prioritising action for HCVs in jurisdictional and landscape settings. HCV Network Ltd.

A range of excellent resources to support landscape approaches and integrated landscape management are also available from Landscape for People Food and Nature and EcoAgriculture Partners, several of which are highlighted here.

Defining landscape boundaries

LandScale. Assessment guidelines. Section 2 'Boundary selection'. Version 0.2. October 2020.

Gullison, R.E., Hardner, J., Anstee, S. & Meyer, M. (2015) Good practices for the collection of biodiversity baseline data. Prepared for the Multilateral Financing Institutions Biodiversity Working Group & Cross-Sector Biodiversity Initiative.

Hanson, C., Ranganathan, J., Iceland, C. & Finisdore, J. (2012) The corporate ecosystem services review: Guidelines for identifying business risks and opportunities arising from ecosystem change. Version 2.0. World Resources Institute: Washington, DC.

IFC Performance Standards (2012): Performance Standard 1 - Assessment and management of environmental and social risks and impacts and Performance Standard 6 Biodiversity conservation and sustainable management of living natural resources. Available from: www.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/Sustainability-At-IFC/Policies-Standards/Performance-Standards/

Landscape finance

Shames, Seth, and Sara J. Scherr. 2020. Mobilizing finance across sectors and projects to achieve sustainable landscapes: Emerging models. EcoAgriculture Partners: Washington, DC.

Impact assessment and mitigation planning

ARRC Taskforce website: Various industry briefings, best practice resources and guidance available and under development relating to the assessment and mitigation of impacts from energy, extractive and associated infrastructure projects on apes.

Arcus Foundation (2014) State of the Apes: Extractive Industries and Ape Conservation. Cambridge University Press: Cambridge, UK.

Arcus Foundation (2015) State of the Apes: Industrial Agriculture and Ape Conservation. Cambridge University Press: Cambride, UK.

Arcus Foundation (2018) State of the Apes: Infrastructure Development and Ape Conservation. Cambridge University Press: Cambridge, UK.

Brownlie, S. & Treweek, J. (2018) Biodiversity and ecosystem services in impact assessment. Special Publication Series No. 3. International Association for Impact Assessment: Fargo, USA.

Brownlie, S. & Treweek, J. (2016) 'Biodiversity offsets for 'no net loss' through impact assessment', in D. Geneletti (ed) Handbook on biodiversity and ecosystem services in impact assessment. Edward Elgar Publishing: Cheltenham, UK., pages 364-398.

Bull, J.W., Baker, J., Griffiths, V.F., Jones, J.P.G., and Milner-Gulland, E.J., (2018) Ensuring No Net Loss for people and biodiversity: Good practice principles. Oxford, UK.

BBOP (2012) Standard on biodiversity offsets. The Business and Biodiversity Offset Programme (BBOP): Washington, DC.

do Rosário Partidário, M. (2012) Strategic Environmental Assessment better practice guide - methodological guidance for strategic thinking in SEA. Portuguese Environment Agency and Redes Energéticas Nacionais, Lisbon.

Geneletti, D. (ed.) (2016) *Handbook on Biodiversity and Ecosystem Services in Impact Assessment.* Research handbooks on impact assessment. Edward Elgar Publishing: Cheltenham, UK.

Hardner, J., Gullison, R.E., Anstee, S. & Meyer, M. (2015) Good practices for biodiversity inclusive impact assessment and management planning. Prepared for the Multilateral Financing Institutions Biodiversity Working Group.

International Association for Impact Assessment (various dates and authors):

- Special publication series on international best practice principles of impact assessment.
- Introduction to impact assessment topics on International Association for Impact Assessment wiki page.

IFC Performance Standards (2012). Available from: www.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/Sustainability-At-IFC/Policies-Standards/Performance-Standards/

IFC (2013) Good practice handbook: Cumulative impact assessment and management, guidance for the private sector in emerging markets. IFC: Washington, DC.

Landsberg, F., Treweek, J., Stickler, M.M., Henninger, N. & Venn, O. (2013) Weaving ecosystem services into impact assessment. A step-by-step method. Version 1.0. World Resources Institute: Washington DC.

Richards, M. (2011) Social and Biodiversity Impact Assessment (SBIA) manual for REDD+ projects. Climate, Community & Biodiversity Alliance and Forest Trends with Rainforest Alliance and FFI. Washington, DC. This resource comprises a core guidance document, Social Impact Assessment Toolbox and Biodiversity Impact Assessment Toolbox.

The Biodiversity Consultancy (2015) A cross-sector guide for implementing the mitigation hierarchy. Cross Sector Biodiversity Initiative: Cambridge, UK.

World Bank Group environmental, health, and safety guidelines (general and industry sector specific guidelines including oil and gas, mining, agriculture, forestry, infrastructure and power). World Bank Group: Washington, DC.

Methods and tools

Table 5 below brings together examples of methods and tools that can support the implementation of the main steps of the framework. The methods and tools included here represent a small sample of the hundreds that are available, and tools presented under one theme may also be applicable to other themes. In application, it is important that users investigate a broad range of methods and tools and select the right combination for their respective context and particular stage in the process.

Strengthening existing impact assessment and land use planning frameworks by using this framework

Considering this framework during the implementation of SEA, EIA/ ESIA, cumulative impact assessment and land use planning can help strengthen the outcomes for biodiversity and ecosystem services through a more nature-centric approach that improves identification of values through to appropriate action that delivers social and environmental gains. Table 6 below provides a brief description of the framework, the main target users and how this framework can contribute. One example of an overview guidance is provided for each framework.

Table 5 Example approaches, methods and tools and their relevance to implementing the framework

Theme	Approach, method or tool	Brief description	Contributions to the framework	Relevance to framework			
				Step 1	Step 2	Step 3	Step 4
Stakeholder analysis and engagement	Stakeholder analysis and engagement. Examples include: Overseas Development Institute (2009) Planning tools: stakeholder analysis. Toolkits Business for Social Responsibility (2019) Five-step approach to stakeholder engagement Richards, M. (2011) SBIA manual for REDD+ projects: Part 2 – Social Impact Assessment toolbox.	A growing number of guides are available to support stakeholder analysis and engagement.	· Stakeholder analysis, mapping, engagement and active coordination and collaboration are fundamental to the application of all steps of the framework; engaging stakeholders as early as possible and throughout assessment, planning, decision-making and adaptive management processes. Stakeholders may be individuals, communities or organisations.	X	X	X	X
Understanding social and ecological values, risks and opportunities	Social science research assessment methods (including participatory approaches). Overview of tools in: Newing, H. et al (2011) Conducting research in conservation: A social science perspective.	A suite of social science methods are appropriate for conservation and natural resource related topics including qualitative and quantitative methods such as participant observation, interviewing and questionnaires, documenting local environmental knowledge and change, and participatory methods such as the 'Participatory Rural Appraisal' toolbox.	· Provides appropriate methods and tools for understanding the socio-economic context and ecosystem service values related to natural resource use through stakeholder engagement and research. · Provides methodology and tools for ongoing dialogue.	X	X	X	X
	Ecosystem service approaches Examples include: Ecosystem service review and Weaving ecosystem services into impact assessment Exploring natural capital opportunities, risks & exposure (ENCORE) Toolkit for ecosystem service site-based assessment (TESSA) Natural capital protocol Targeted scenario analysis (UNDP)	A growing number of tools are available to assess and support prioritisation and decision-making related to ecosystem services.	· Provides data and information on the identification of ecosystem services · Provides insight into the potential impacts of development on communities and the dependencies of companies on ecosystem services, through to mitigation planning · Supports approaches for landscape level collaboration, especially where a company has dependency on an ecosystem service that is at threat and requires multiple actors to address the issue.	X	X	X	X

Theme	Approach, method or tool	Brief description	Contributions to the framework	Relevance to framework			
				Step 1	Step 2	Step 3	Step 4
Understanding social and ecological values, risks and opportunities	Mapping social landscapes: A guide to identifying networks, priorities and values of restoration actors (Buckingham et al., 2018)	Introduces a focus on mapping the people who live, work and depend on landscapes, translating methodologies often used in fields of health and national security for application to promote restoration. Presents two main approaches to understanding social landscapes: 1) mapping connectivity through participatory social network analysis; and 2) mapping priorities and values. The Tenure Diagnostic Tool (McLain et al., 2018) is an additional resource to support the identification of realistic restoration opportunities.	· Provides important input to assessing and understanding the social landscape (focussed on actors) · Provides data and information on priorities and values · Supports stakeholder analysis and engagement · Maps social opportunities for restoration · Information and relationships built through the process may improve impact assessment and mitigation planning.	X	X	X	
	Critical Habitat (CH) Assessment Guidance Note 6: Biodiversity conservation and sustainable management of living natural resources (IFC, 2019)	CH identification is required by the IFC's Performance Standard 6 to manage risks and avoid, mitigate, and offset impacts to areas with high biodiversity value. These areas include: 1) habitat of significant importance to IUCN red listed Critically Endangered and/or Endangered species; 2) habitat of significant importance to endemic and/or restricted-range species; 3) habitat supporting significant global concentrations of migratory species and/or congregatory species; 4) highly threatened and/or unique ecosystems; and/or 5) areas associated with key evolutionary processes. CH designation is independent of a project's impact footprint and can be identified without reference to a project as the CH values are determined under baseline conditions.	· Provides input data to help establish the biodiversity baseline and priorities for conservation · Can help inform the application of the mitigation hierarchy by applying the requirements for mitigation in CH · Is a process for developing evidence base and management strategies in compliance with Guidance Note 6 Paragraph 79 on Great Apes.	X		X	

Theme	Approach, method or tool	Brief description	Contributions to the framework	Relevance to framework			
				Step 1	Step 2	Step 3	Step 4
Understanding social and ecological values, risks and opportunities	Species habitat suitability assessment	Habitat suitability assessments are spatial approaches that assess the relative capacity of a habitat or vegetation unit to support the presence of a species. Parameters of species requirements (e.g. habitat preference, connectivity, resource requirements) are spatially modelled with an underlying vegetation layer and known species presence records to extrapolate and model the capacity of habitat to support species population. Such model outputs require verification and empirically-based validation following the development and calibration stages in order to ground-truth the accuracy of the model outputs.	· Provides input data to help establish the biodiversity baseline and priorities for conservation · Can help inform restoration priorities by identifying the potential capacity of a vegetation type in supporting a species, which could then be increased through active restoration of habitat condition · Can help inform habitat where impacts need to be avoided due to their high capacity to support a given species population · Provides input data to help identify the areas across a landscape which have more capacity to support a given species population.	X		X	
	Population viability assessment A Practical handbook for population viability analysis (Morris et al., 1999)	An analytical approach that uses quantitative methods to predict the likely future status of a species population or collection of populations of conservation concern, incorporating a variety of spatially explicit and quantitative tools and modelling approaches. It commonly utilises species demographic data to model the likelihood that a given population will persist for a given period of time. This helps to inform conservation priorities by providing insight into how many populations need to be conserved in order to improve the chances of species persistence and by identifying critical thresholds and parameters that result in a species population collapse, which might result in the species' extinction.	· Provides input data to help establish the biodiversity baseline and priorities for conservation · Can help inform conservation priorities by identifying the species populations that are more susceptible to collapse · Can help inform mitigation actions where impacts to a species needs to be avoided and minimised due to the population's higher risk of collapse.	X		X	
	Restoration Opportunities Assessment Methodology (ROAM): Assessing forest landscape restoration opportunities at the national or sub-national level (IUCN & WRI, 2014)	A stepwise, iterative process to identify and prioritise Forest Landscape Restoration (FLR) opportunities. Steps involve identifying the need for restoration based on national priorities, the type and potential of appropriate FLR interventions, the scope and availability of land, economic costs and benefits of potential interventions and the legal institutional, policy and financial limitations and opportunities. ROAM is designed primarily to provide relevant analytical input to national or subnational policy and operational processes	· Methodology and tools to support the process of assessing restoration opportunities · Outputs can help to point decision-makers and planners to areas where they are more likely to find restoration opportunities and provides preliminary information on how to go about restoration of such areas.	X		X	

Theme	Approach, method or tool	Brief description	Contributions to the framework	Relevance to framework			
				Step 1	Step 2	Step 3	Step 4
Landscape level processes (priorities, actions, governance, collaboration, evaluation)	Systematic Conservation Planning (Margules et al., 2000)	A discipline and approach that focuses on the prioritisation of resources for biodiversity conservation. It proposes a structured, consultative process for choosing between, locating, configuring, and implementing conservation actions, often involving input from policy makers, land managers and resource users and often uses decision support software such as Marxan, Zonation and C-Plan. Conservation objectives are specified quantitatively, and outputs are optimal sets of spatially bounded conservation actions.	· Provides input data to help establish the biodiversity baseline and priorities for conservation · Can help to identify pressures and trade-offs in the landscape and cumulative impacts · Provides a top-down planning approach to inform and align the implementation of mitigation actions at a project level. · Supports adaptive management to achieve landscape conservation objectives	X	X	X	X
	Target-based ecological compensation Moving from biodiversity offsets to a target-based approach for ecological compensation (Simmonds et al., 2019)	Target-based ecological compensation aligns project-level compensation for residual losses from development projects, to the achievement of a nation or jurisdiction's explicit biodiversity targets, via one of three pathways – net gain, no net loss, or rarely managed net loss. It is a framework designed to help to connect project-level responses to these broad biodiversity targets to achieve desirable outcomes for stakeholders and biodiversity. It advances ecological compensation beyond a reactive, ad-hoc response, to ensuring alignment between actions addressing residual biodiversity losses and achievement of overarching targets for biodiversity conservation.	· Consideration of compensation ratios for Projects/ sectors to meet jurisdictional targets · Focusing on the last step of the mitigation hierarchy, ensuring mitigation action by sectors to allow persistence or improvement of biodiversity at the landscape level.			X	X
	Nature-based solutions. Global standard for nature-based solutions: A user-friendly framework for the verification, design and scaling up (IUCN 2020). Other associated resources available to download.	Actions designed to address societal challenges through the protection, sustainable management and restoration of ecosystems, benefiting both biodiversity and human well-being.	· Potential approach to actions for the mitigation hierarchy planning and application stages · Actively seeks to generate multiple social and environmental benefits.			X	X

Theme	Approach, method or tool	Brief description	Contributions to the framework	Relevance to framework			
				Step 1	Step 2	Step 3	Step 4
Landscape level processes (priorities, actions, governance, collaboration, evaluation)	Assessing landscape governance: A participatory approach (De Graaf, Buck, Shames & Zagt, 2017)	This manual introduces a method of assessing landscape governance in a participatory way. It involves four criteria: 1) inclusive decision-making in the landscape; 2) culture of collaboration in the landscape; 3) coordination across landscape sectors, levels and actors; and 4) sustainable landscape thinking and action.	· Supports participatory assessment of landscape governance and provides an important foundation from which to build coordinated and collaborative action in the landscape	X		X	X
	Tools to support multi-stakeholder partnerships and processes and integrated landscape approaches. Descriptions of tools in: Brouwer et al. (2015) 'The MSP Guide. How to design and facilitate multi-stakeholder partnerships' 'A methods toolbox for integrated landscape approaches' (Chapter 6 in *'Operationalizing integrated landscape approaches in the tropics'* by Reed et al. 2020)'	There are many tools, methods and guidance available to support the establishment and ongoing functioning of multi-stakeholder partnerships. Brouwer et al. (2015) introduces and summarise 60 different tools including many tools based on participatory learning and action, design thinking, dialogue processes, and large-scale group intervention methodologies. Reed et al. (2020) brings together a selection of methods and tools to support the inclusive, participatory, adaptive and dynamic process of applying landscape approaches.	· Supports establishment and function of multi-stakeholder processes and partnerships · Highlights available options that can facilitate an enhanced shared understanding of the landscape context and dynamics and support implementation of a landscape approach · Featured tools can support the collaborative and participatory assessment of the landscape and may be used to improve identification and assessment of potential impacts and of mitigation opportunities.	X	X	X	X
	Spatial planning and monitoring of landscape interventions: Maps to link people with their landscapes: A user's guide (Willemen, Kozar, Desalegn & Buck, 2014)	This resource is designed to stimulate the use of maps in cross-sectoral collaborations to help locate, design and monitor interventions in rural landscapes. Various tools have also been developed to support community-engaged mapping, such as MAPEO – Digital Democracy, which is a free digital toolset for documenting, monitoring and mapping many types of data.	· Support the joint assessment and understanding of the landscape, identification of shared issues and solutions · Promote stakeholder-engaged process of mapping, planning and monitoring landscape interventions.	X	X	X	X

Theme	Approach, method or tool	Brief description	Contributions to the framework	Relevance to framework			
				Step 1	Step 2	Step 3	Step 4
Landscape level processes (priorities, actions, governance, collaboration, evaluation)	The Landscape investment and finance toolkit	A three-module process and materials that help landscape initiatives define, develop and find finance for their landscape priorities. The tool guides you through a process to find the types of investors that might be interested in your landscape-specific business cases and develop pitch materials to successfully acquire that finance.	· Provides a process to mobilise finance for landscape projects.			X	X
	LandScale assessment framework and guidelines Version 0.2	LandScale provides a standardised approach for assessing and communicating the sustainability performance of landscapes. The assessment framework is grounded in international norms and methods for assessing sustainability and is structured hierarchically to meet the dual needs of global consistency and local adaptability. Four pillars of sustainability performance: ecosystems, human well-being, governance, and production. Pillars and goals provide a holistic structure for assessing sustainability, which users can tailor to different landscapes by selecting context-appropriate indicators and performance metrics. Detailed guidance on conducting an assessment is available.	· Provides guidance on defining landscape boundaries for assessment · Supports development of landscape level sustainability performance monitoring · Additional Sustainable Landscapes Partnership module supports monitoring and reporting on landscape partnerships.	X	X	X	X

Table 6 How this framework can strengthen existing frameworks and processes.

Existing framework/ process	Main target user/s	Brief description	Contributions of the framework
Strategic Environmental (and Social) Assessment E.g. Strategic Environmental Assessment better practice guide (European Commission, 2012)	Government May be commissioned/ overseen by multilateral development banks	SEA is a process and a tool for evaluating the effects of proposed policies, plans and programmes on natural resources, social, cultural and economic conditions and the institutional environment in which decisions are made. SEA might be applied to an entire sector (such as a national policy on energy for example) or to a geographical area (for example, in the context of a regional development scheme).	· The starting point is on maintaining persistence of priority biodiversity and ecosystem services within multi-use landscapes · Sets limits based on biodiversity and ecosystem service requirements for persistence (e.g. no further loss of ape habitat) to bound decision-making and make losses explicit · Explicitly considers the biodiversity and ecosystem service responses to mitigation, which increases the likelihood of successful mitigation action · Seeks collaboration among companies and across sectors and stakeholders on mitigation actions that meet social and ecological goals · Encourages cross sectoral collaboration in the delivery of the mitigation hierarchy in the landscape, particularly with respect to cumulative impacts
Environmental and Social Impact Assessment E.g. Biodiversity and ecosystem services in impact assessment (Brownlie & Treweek, 2018) E.g. Handbook on Biodiversity and Ecosystem Services in Impact Assessment (Geneletti, 2016)	Government and business Government requires ESIA by proponents of specified programmes, projects, activities Proponents need ESIA as part of planning and permitting process to deliver and operate	The purpose of the ESIA is to assess and predict potential adverse social and environmental impacts and to develop suitable mitigation measures, which are documented in an Environmental and Social Management Plan. An ESIA is applicable for projects that have been identified by the Environmental and Social Management System screening as high or moderate risk projects, requiring full or a partial ESIA respectively.	· Existing best practice guidance can be used to support Project Level impact assessment and mitigation · Strengthens the selection of mitigation options and the potential success of those mitigation actions through identification of values and understanding how biodiversity and ecosystem services respond to mitigation actions · Highlights the potential for collaboration on mitigation actions both between social and environmental departments within a company, and with other sectors and stakeholders
Cumulative impact assessment / Cumulative effects assessment and management E.g. Good practice handbook: Cumulative impact assessment and management: Guidance for the private sector in emerging markets (IFC, 2013)	Government and business May be commissioned/ facilitated/ overseen by multilateral development banks Government has responsibility for and sets cumulative impact assessment framework for business led-cumulative impact identification and mitigation Often part of the EIA/ ESIA scope of work (i.e. chapter) for individual project applications	Framework and process for assessing and managing cumulative effects. Many of the current and developing methods and tools for cumulative effects assessment and management / cumulative impact assessment are similar to those used for ESIA practice. The primary difference is related to the need to incorporate other actions and their contributions to cumulative effects on specific valued ecosystem components. Such incorporation is often done by simple modifications to existing ESIA methods and tools, such as adding "other actions" questions to questionnaire checklists focused on identifying direct and indirect impacts of proposed actions; modifying interaction matrices to include columns related to past, present, and future actions; and modifying network diagrams to include other actions.	· May inform the definition of Valued Environmental and Social Components in the African ape range landscapes · Is future-orientated and promotes the understanding of the conditions of Valued Environmental and Social Components expected to result from multiple developments · Requires an analysis of sector developments in the future and the identification of cumulative impacts, existing best practice for cumulative impact assessments can be useful references for implementation
Land use planning frameworks E.g. Land Use and Spatial Planning (Metternicht, 2018)	Government, civil society, business	Land use planning can broadly be defined as the systematic assessment and allocation of land to different uses across a defined area in such a way that economic, social and environmental objectives are balanced. There are many land use planning policies and systems in operation, however since the 1960s there has been an evolution from top-down expert driven approaches, to integrated, multi-stakeholder approaches including integrated land use planning, spatial land use planning, participatory land use planning, participatory rural planning, territorial ecological planning, ecosystem-based land use planning.	· The starting point is on maintaining persistence of priority biodiversity and ecosystem services within multi-use landscapes · Provides the spatial and temporal parameters for social and ecological assessment and enables consideration of ecosystems scale composition, structure and function for consideration in land use planning · Sets limits based on biodiversity and ecosystem service requirements for persistence (e.g. no further loss of ape habitat) to bound decision-making and make losses explicit · Explicitly considers the biodiversity and ecosystem service responses to mitigation, which increases the likelihood of successful mitigation action · Seeks collaboration within companies and across sectors and stakeholders on mitigation actions that meet social and ecological goals

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