CONSERVATION-FRIENDLY ECONOMIC DEVELOPMENT IN CAMBODIA'S PROTECTED AREAS

EXPLORING PRIVATE SECTOR PARTNERSHIP OPPORTUNITIES AND ENABLING POLICIES IN THE CARDAMOM MOUNTAINS

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Cover photo: Lemongrass essential oil production by communities in Central Cardamoms National Park. Photo: Fauna & Flora International

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The report ***"Conservation-Friendly Economic Development in Cambodia's Protected Areas - Exploring Private Sector Partnership Opportunities and Enabling Policies in the Cardamom Mountains,"*** is a World Bank advisory product developed for the Royal Government of Cambodia (RGC) to support sustainable economic development in Protected Areas (PAs) as part of a broader strategy for sustainable management of the country's natural capital. The advisory work was undertaken as part of a broader World Bank effort in Cambodia to provide guidance to the RGC through technical assistance and analytical and advisory services on managing its natural capital through landscape approaches. Working in the Cardamom Mountains, the Mekong Delta, and the upstream Mekong, the Bank is helping the RGC to better manage and add value to its natural capital by strengthening its links to the economy.

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ABBREVIATIONS AND ACRONYMS

CF	Community Forestry
CFEA	Conservation-friendly economic activities
CI	Conservation International
CITIES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CML	Cardamom Mountains Landscape
CSLEP	Cambodia Sustainable Landscape and Ecotourism Project
CPA	Community Protected Area
ELC	Economic Land Concession
EIA	Environmental Impact Assessment
FA	Forestry Administration
FAO	Food and Agriculture Organization
FFI	Fauna & Flora International
FTE	Full-Time Equivalent
FPIC	Free, Prior, and Informed Consent
FSC	Forest Stewardship Council
GAP	Good Agricultural Practices
GDP	Gross Domestic Product
MAFF	Ministry of Agriculture, Forestry, and Fisheries
MFI	Microfinance Institution
MLMUPC	Ministry of Land Management Urban Planning and Construction
MoE	Ministry of Environment
NGO	Non Governmental Organization
NP	National Park
NTFP	Non-Timber Forest Products
NWFP	Non-Wood Forest Products
PA	Protected Areas
PDoE	Provincial Department of Environment
PES	Payment for Ecosystem Services
PPP	Public-Private Partnership
REDD+	Reducing Emissions from Deforestation & Degradation, + the sustainable management of forests
SUZ	Sustainable Use Zone
SLC	Social Land Concession
ToC	Theory of Change
UNDP	United Nations Development Program
UNWTO	World Tourism Organization
WB	The World Bank
WCS	Wildlife Conservation Society
WS	Wildlife Sanctuary

ABOUT THIS REPORT

This report was prepared as part of ongoing support from the World Bank to the Royal Government of Cambodia (RGC) on livelihoods development in Protected Areas (PAs). It aims to provide support to the RGC in identifying new economic opportunities to develop livelihoods through the Cambodia Sustainable Landscape and Ecotourism Project (CSLEP) (Box 1). The recommendations are intended to be practical and implementable during the lifetime of the Project.

The Development Objective of the CSLEP is to improve PAs management, promote ecotourism opportunities, and promote non-timber forest products (NTFPs) in the Cardamom Mountains – Tonle Sap area.

Geographical coverage of the report – While the CSLEP project includes the Tonle Sap great lake, floodplain, and foothills north of the lake, this report focuses on the Cardamom Mountains Landscape (CML).

This report follows a previous report on *Enabling Development of Ecotourism in Cambodia* and several studies, previously commissioned by the World Bank, on the prioritization of value chains for NTFPs. It focuses on opportunities for economic development in Community Protected Areas (CPAs) and Community Forestry (CF), and more generally, for people living in buffer areas around PAs in the CML.

Following a chapter providing the context in Cambodia and an overview of the landscape dynamics and livelihoods within it, the report outlines planning needs for conservation-friendly development and presents opportunities for Conservation-friendly economic activities (CFEA). Based on the assessment of the barriers to establishing an enabling environment for private sector engagement, options for job creation are discussed, followed by recommendations for developing value chains and enabling conditions for private sector participation.

Box 1. Cambodia Sustainable Landscape & Ecotourism Project

The World Bank's International Development Association is providing a loan to the Royal Government of Cambodia for the implementation of the CSLEP project, which is led by the Ministry of Environment and the Ministry of Rural Development. The Project is financed by IDA (US$ 51 million) and GEF (US$ 4.2 million). The objectives include:

Strengthening the capacity for PA landscape planning and management by developing an Information System and Decision Support, preparing PA and Community PA management plans, and providing technical assistance on a PA enforcement framework. The Ministry of Environment implements this activity.

Strengthening opportunities for ecotourism and non-timber forest products (NTFP) value chains by enhancing the enabling environment for private sector engagement and by investing in infrastructure such as visitor centers, waste management, and NTFP processing and storage facilities. The Ministry of Environment (MoE) implements this activity.

Improving access and connectivity through the rehabilitation of rural roads and other related rural infrastructure to help in the development of ecotourism corridors and links with main markets.

EXECUTIVE SUMMARY

DEVELOPING A CONSERVATION-FRIENDLY ECONOMY: OPPORTUNITIES IN CAMBODIA'S PROTECTED AREAS

KEY MESSAGE 1

Cambodia's Protected Areas provide critical ecosystem services and are key to climate change mitigation and adaptation.

Despite rapid economic growth in recent years, Cambodia remains a biodiversity hotspot in the region, providing critical ecosystem services. Cambodia has one of the highest ratios, globally, of territory in Protected Areas (PAs). The PAs contain rich biodiversity and ecosystems that have been largely lost in neighboring countries. These PAs also provide critical ecosystem services to Cambodia's economy in terms of water flows regulation, sedimentation control, non-timber forest products, and ecotourism revenues. Agriculture, which depends heavily on water flow regulation, erosion reduction, and nutrient retention services, generated 22% of the Gross Domestic Product (GDP) in 2018.[1] Tourism and ecotourism, benefiting from the Kingdom's spectacular landscapes and biodiversity, contributed to 18% of the GDP in the same year.i Additionally, hydropower dams, which benefit from the sedimentation control provided by forests, generated 58% of Cambodia's electricity production.[2]

The Cardamom Mountains landscape (CML) in southwestern Cambodia forms the largest area of contiguous protected forest in Indochina. The CML spans five provinces and has a network of seven PAs. This area contains iconic and globally important biodiversity, including the critically endangered Siamese crocodile (*Crocodylus siamensis*), the endangered pileated gibbon (*Hylobates pileatus*), and the largest population of Asian elephants in Indochina. In addition, its watersheds and forests provide critical ecosystem services and sources of livelihood for millions of people. The ecosystem services from the eastern slopes of the Cardamom Mountains, alone, represent a net present value of US$99 million and an annual value of US$8 million from the regulation of water flows, sedimentation control, non-timber forest products, and ecotourism revenues. Thanks to these ecosystem services, households living inside PAs have lower poverty rates than households in villages outside PAs with similar access to infrastructure.

Forests in PAs are at the core of Cambodia's climate change mitigation strategy. The forests of the CML store a massive amount of carbon that would be valued at US$ 1 billion, with a carbon price of US$5/tCO2e.1 Preserving the carbon stored in these forests, while maintaining the ecosystem services provided, is essential for mitigating and adapting to climate change, which is expected to have major impacts on agricultural production in Cambodia.

KEY MESSAGE 2

Conservation-friendly economic development is needed to improve the livelihoods of communities inside PAs, which have been affected by COVID-19.

Lack of access to markets and services makes life difficult for many households. Many rural people are landless or land poor and have difficulties accessing services. Non-timber forest products (NTFPs) and other forest resources provide additional income, but these sources of income are seasonal, driven by a small number of buyers, and are declining. Rice cultivation is the main livelihood activity, with annual crops and permanent crops growing in importance. Wages from commercial farms developed by outside investors, and remittances from domestic and international migrants, are essential sources of livelihoods. Although difficult

1 Maurice Rawlins et al., "Valuing the Ecosystem Services Provided by Forests in Pursat Basin, Cambodia" (Washington, DC: World Bank, 2020). The study highlights the significant economic value that intact forests and ecosystems provide for downstream water services.

2 International Energy Agency, Electricity Balance of Cambodia for 2018.

to quantify, illegal activities, such as poaching and logging, are also important income sources for many households, especially in case of unexpected expenses.

Impacts of COVID-19 are severely felt in Cambodia, generally and in the CML, with tourism being the most impacted sector. The agricultural sector has been relatively unscathed and is a pillar of resilience for households that have suffered other losses, such as reduced remittances from domestic and international migrants. Reduced household income is particularly concerning given the high indebtedness in the CML, with household debt often informal and collateralized by land titles for many households. This high level of debt, combined with the income loss from COVID-19, can lead to a critical economic situation that may threaten hard-earned conservation achievements in the landscape.

Conservation-friendly economic activities are critical for creating jobs while also taking pressure off forest encroachment. Forest products have complex value chains and require value-added processes and specialized markets to become viable. In most cases, communities alone are not prepared to take advantage of the economic potential. Private and community partnerships can help materialize this potential, create jobs and income if the enabling environment is put in place. Engaging the private sector is also critical for transitioning from illegal, unsustainable activities to conservation-friendly economic activities and for creating higher quality jobs than those relying on non-sustainable activities.

KEY MESSAGE 3

The Cardamom Mountains landscape (CML) has significant private sector partnership opportunities for conservation-friendly economic development.

The CML is a 'frontier' under severe pressure with complex social, economic, and environmental dynamics. The recent history of economic development initiatives in PAs involves two contrasting visions. On the one hand, large-scale economic land concessions have led to massive landscape transformations, without always benefiting local people but significantly impacting biodiversity. On the other hand, a network of innovative social enterprises has pioneered business models that aim to reconcile development and conservation but remain small-scale, operate partially in an unregulated environment, and primarily rely upon donor support.

The need to improve the quality of life for local communities and develop the economy can often conflict with biodiversity conservation. The differences in stakeholders' ambitions can be significant and can present substantial obstacles to PA conservation. However, there are multiple pathways where these different visions can coincide. This report aims to explore some of these pathways, where the objectives of private actors, the government, conservation NGOs, and local people can coincide for shared value creation, more sustainable PA management, and quality job creation.

The CML benefits from a good climate for high-added-value production and degraded land inside PAs that can be dedicated to sustainable development. The wide altitudinal and climatic range in the CML allows for agricultural products that are unviable in the lowland plains of the country. These favorable climatic conditions make the CML interesting for private sector investment. In addition, degraded lands cannot be found in CPAs but are widely available within the Community Zones and Sustainable Use Zones of PAs. Significant parts of these areas are now degraded due to the lack of management plans or demarcations, and the weak enforcement of PA laws. With appropriate regulatory changes, these degraded areas could be made available for conservation-friendly economic activities (CFEA) and could have good potential for community-private sector partnerships.

In addition, the CML is close to markets, and synergies exist between ecotourism and CFEA. The CML is unique in that it is a large wilderness area relatively close to markets, such as large urban areas like Phnom Penh,

tourism centers like Sihanoukville, and international markets accessible via road, sea, and air. Furthermore, existing and planned ecotourism development in the CML provides additional local markets for fresh produce and some NTFPs.

KEY MESSAGE 4

Several conservation-friendly economic activities could be implemented in CPAs across the landscape over the next five years.

Several non-timber forest products and other conservation-friendly economic activities already exist in the CML and can be brought to scale with increased engagement of private investors. There is expressed demand from qualified private initiatives with good track records, and at the same time, there is strong potential for job-creating value chains.

Several strategic actions can be undertaken to attract the interest of investors and to facilitate community partnerships on the ground. This requires an impartial facilitation role that could be occupied by the MoE or by other intermediaries, such as local non-governmental organizations (NGOs) operating in the area. The following actions can assist in lowering the entry barriers for private investors in different value chains.

Plantation forestry value chains could be developed in degraded CPA areas. Short-rotation tree plantations, such as Acacia and Eucalyptus, with intercropping of agricultural crops, have good potential to provide short-term and longer-term income while reducing pressure on natural forests. These plantations should be developed only in highly degraded parts of CPAs using smallholder planting, particularly in areas where agriculture is uneconomic. More detailed mapping of the CML and targeted consultation should be undertaken to identify suitably degraded areas for such developments.

Further added value could be generated by supporting intercropping value chains. Short-rotation tree plantations with intercropping provide benefits to both companies and local communities and could be promoted in the CML. Technical support could also be provided to improve the security of the market for the second crop, which would help overcome the main barrier to the expansion of such intercropping.

Promoting the processing of wood residues into sustainable charcoal could have a significant impact. In parts of the CML, like Phnom Aural, charcoal is a major driver of forest degradation. Integrated models that involve the processing of wood residues from thinning, harvesting, and processing into sustainable charcoal could be promoted to alleviate this pressure on PAs while contributing to job creation.

Expanding multi-stakeholder production models to vegetables and fruits could bring income and biodiversity benefits. For the domestic market, high-quality Good Agricultural Practices (GAP) , or organic vegetables, are in high demand. Following good experiences in Cambodia, outgrower farming models can be promoted in the CPA, especially in areas near ecotourism sites or in those that have good access to urban centers. For these premium markets, farmers' cooperatives need technical assistance and could increase their value creation through the provision of infrastructure, like greenhouses and cold storage. Developing incentive mechanisms to encourage farmers to maintain biodiversity in and around plantations of permanent crops is recommended. Examples of such incentives include the expansion of the Ibis Rice model to other crops and commodities and the use of tax credits, direct Payment for Environmental Services (PES) , or grants for maintaining native tree cover.

Developing value chains for livestock integrated into the landscape through silvo-pastoralism also has good potential. Farming premium livestock, such as indigenous pig-raising using silvo-pastoralism, could provide significant benefits for all stakeholders and the environment and can also improve ecotourism experiences. Still, wildlife farming should only be considered under the strict conditions that encourage conservation. Chicken farming could be promoted to

increase the nutritional and economic well-being of local people and to partially offset the widespread illegal hunting in CML PAs.

Several NTFPs have the potential to improve livelihoods with minimal impact on biodiversity. Wild honey production could be scaled up in the CML by including better marketing and expansion of "rafter beekeeping"[3] in degraded areas. Conservation-friendly cardamom, cultivated in the understory of degraded forests, also appears to have good potential. Conversely, the collection and farming of bamboo and rattan seem to have low profitability, as village enterprises are without significant investment to develop the sector. Forest farming should not be applied in areas of high conservation value. In already degraded areas in the CML, however, forest farming of high-value cash crops, such as cardamom, could be planted with useful trees contributing to ecosystem restoration. These crops could also be cultivated in the understory of degraded forests and marketed using the distinct Cambodian 'brand'. Forest farming of turmeric, ginger, and galangal could be promoted, along with high-value tree planting.

KEY MESSAGE 5

Major regulatory and institutional barriers limit the development of CFEA and favor more destructive forms of economic development, thus leading to land-use change and biodiversity loss.

The main barrier to private sector investment in conservation-friendly enterprises is an inadequate enabling regulatory framework for the PA systems. While the Protected Area Law under MoE jurisdiction regulates the economic activities permitted in PAs and CPAs, their commercialization and trade are regulated by the Forestry Law under the Ministry of Agriculture Forestry and Fisheries. The Forestry Law requires a high number of permits and authorization to operate formally, which is generally beyond local community capacity. The regulatory framework regarding forest products strongly favors private sector investments in large-scale forest plantations over sustainable management of natural forests.

In addition, the CPAs' weak land tenure prevents long-term investment in CFEA. Private initiatives are attracted by available degraded lands for economic development, but CPAs face legal constraints that make it difficult for investors and partners:

- Most CPAs are not yet legally established, and zones and boundaries are yet unclear, which is the prerequisite for any economic activity or long-term private partnership.
- The PA Law limits CPA management agreements to 15 years, precluding investments that require longer timeframes, such as forestry.
- According to PA Law and the Guideline on Procedure and Process for Community Protected Area Establishment, CPAs are unable to contract with anyone but the MoE.
- A new directive that allows households that have been living inside PAs for 10 or more years to claim official land title will potentially provide needed tenure security for individual families, but it also has the potential to fuel land speculation and to promote the fragmentation of PAs and CPAs.

3 Rafter beekeeping aims to mimic branches of large trees by using tree poles positioned at a slight angle and easily accessible from the ground in order to attract migrating swarms of Apis dorsata. Eric Guerin, "Rafter Beekeeping - Sustainable Management with Apis Dorsata" (WWF, 2019).

In addition, there is a lack of definition for Community Zones in the Protected Areas which could be dedicated to CFEA. Many PAs haven't been properly zoned yet, and management plan and governance in Community Zones are still lacking. The development of management plans accepted by the local stakeholders could orient economic activities to essentially achieve socio-economic and conservation objectives. It would also be a prerequisite to attract responsible investors in CFEA.

A lack of transparent decision-making on private sector partnership with CPAs (and in Community Zones in PAs) and inadequate fiscal incentives further disincentivize private sector investment in conservation-friendly economic activities. Fiscal incentives to encourage investments — such as the Qualified Investments and exemptions from harvesting, processing, and transportation fees — heavily favor large-scale, often less sustainable plantations and other developments over smaller-scale partnerships in CFEA. The MoE would need to collaborate with the Ministry of Economy and Finance (MEF) and the Ministry of Commerce (MoC) to support the CFEA development and remove these barriers to increase the competitiveness of CFEA in the market.

KEY MESSAGE 6

There is a clear road map for unlocking the potential of conservation-friendly development in PAs – policy and legislative reform, improved land tenure, improved PA planning and management, incentives for business investment, and improved capacity of local communities.

The report makes recommendations with associated strategic actions to address the barriers presented previously. If implemented together, these recommendations will form a roadmap for conservation-friendly economic activities.

RECOMMENDATION - Improve the enabling environment for conservation-friendly economic development.

The current regulations provide a weak legal framework for the commercialization of products from CPAs. Private companies investing in CFEA face greater barriers than conventional businesses do, and they do not operate on a level playing field.

The following actions could be taken to remove the barriers preventing the development of CFEA in CPAs and develop an enabling environment:

- The Protected Areas Law (PA Law) needs to be amended to grant further independent legal existences to CPAs, with the right to contract with the private sector to engage in CFEA business activities as long as they part of the CPA management plan.
- Extending CPA agreements from 30 to 50 years would ensure tenure rights with strengths similar to those of long-term leases, if CFEA activities are clearly identified and part of a CPA management plan.
- Changing the PA law to clarify the categories of CFEA activities eligible under different levels of degradation and providing safeguards would avoid creating incentives to further increase ecosystem degradation.
- The PA Law would also provide a legal basis for MoE to issue necessary authorization for the production, transport, storage, and sales/exports of products from CFEA.
- Investors complying with regulations in PAs face unequal competition from actors operating in the informal market. A combination of increased law enforcement targeting illegal businesses and granting incentives (tax exemptions or other measures) for qualified sustainable businesses could be considered.

- MoE and Provincial Department of Environment (PDoE) need to further strengthen their technical capacity to actively promote private community partnerships and act as "honest brokers" between private entities and communities, but also facilitate the public interests and development partners (DPs).

Improve land tenure security for CFEA development in CPAs. Uncertainty around land tenure is a source of conflict in PAs. Tenure for individuals inside CPAs needs to be addressed to take into account potential negative impacts on customary rights.

- Prakas for CPAs, management plans, zoning, and demarcation would need to be completed as soon as possible for CPAs where CFEA will be developed.

- The MoE could also further engage in Community Zones to support the development of a locally approved management plan and to support its implementation.

- To ensure progress is not lost due to land grabbing and other illegal activity, law enforcement in CPAs must be strengthened.

RECOMMENDATION - Improve the planning framework for conservation-friendly development.

The current socio-economic dynamics, land-use change, and biodiversity loss in PAs require improved planning at the landscape level to guarantee long-term outcomes from private partnerships. A proper planning framework is needed before conservation-friendly development can be successfully implemented.

- To ensure fair and equitable outcomes for all parties, transparent procedures for private sector engagement with MoE and local communities need to be developed. Strategic actions required include establishing multi-stakeholder dialogue and a Theory of Change for conservation-friendly economic development in PAs and CPAs.

- Extensive mapping of priority areas in the CML is needed to identify areas for different value chains and potential synergies with existing private sector investments. Before development starts, land-use plans should be agreed upon and be reflected in the management plans, and guidelines need to be established to determine what CFEA should be allowed at what levels of degradation.

- Free, prior, and informed consent by an independent third party is recommended before each investment begins to ensure fair and equitable outcomes for local people. Further safeguards must be provided by defining a set of criteria based on multiple benefits to assess private sector investment.

- Finally, in a planning framework, synergies between infrastructure for ecotourism and CFEA development could be improved.

RECOMMENDATION - Maximize the job creation potential for CFEA by strategically focusing on high priority value chains

Prioritize value chains with higher local quality job creation potential. The potential job creation and the quality and accessibility of the jobs vary depending on the business model and opportunity costs borne to households as a result of shifting livelihood activities. The report provides some estimates of the job creation potential for various CFEA at the scale of a CPA.

Promote models that allow local processing to increase job creation. If local processing makes financial sense and is in line with the community's capacity, it can significantly boost job creation at local level. The example of short-rotation tree plantations showed that the number of jobs created could be doubled at little cost if the residues were to be processed into sustainable charcoal locally. This logic applies to all CFEA and should be a major consideration when selecting projects.

Improvement of capacity of local communities is important to explore job creation potential. Sufficient capacity of the CPA Management Committee or at community level is critical for implementing community-based CFEA, which can require significant investment and labor mobilization, longer return on investment, and complex benefit-sharing between community members.

Local communities must develop their entrepreneurial skills to provide a broader range of services and to improve the reliability and quality of products. Value chains where companies can complement technical training should therefore be prioritized. Additional support from the government or NGOs should be explored in addition.

The fast development of e-commerce in Cambodia offers new opportunities for remote rural areas but requires specific skills. An assessment of required training for CPAs, including skills required for engagement in CFEA, should be undertaken, followed by investment in skills training and coaching to support CPA Management Committees in the long term.

01
THE NEED FOR ECONOMIC DEVELOPMENT IN PROTECTED AREAS

Figure 1. Waterways in the Cardamom Mountains Landscape (CML) provide ecosystem services like water flow regulation and erosion control while also providing benefits and opportunities for ecotourism.

Photo: *Yann François*

MILLIONS OF PEOPLE DEPEND ON PAs THAT SUPPORT IMPORTANT BIODIVERSITY

In Cambodia, millions of people depend on environmental services from the extensive network of PAs that also supports globally significant biodiversity. Despite rapid economic growth in recent years, Cambodia remains one of the poorest countries in Southeast Asia. Cambodia has made considerable progress towards the Millennium Development Goals, including, among others, reducing extreme poverty. Yet, most families that have risen above the national poverty line have done so by small margins, and therefore, they remain susceptible to adverse events, such as the recent COVID-19 pandemic.

Cambodia is a biodiversity hotspot in the greater Mekong region. Its relatively low population density and large intact natural areas retain some species and habitat types that have been lost from neighboring countries. For example, the Cardamom Mountains area is considered the only area in Indochina that has remained large enough for the long-term viability of Asian elephants.[4]

Cambodia has one of the highest ratios globally of the national territory in PAs. Since the Royal Decree on the Creation and Designation of PAs in 1993, the Royal Government of Cambodia (RGC) has designated 7.5 million hectares (ha) of PAs, which constitutes 41% of the total land area.[5,6]

4 Hedges S, Fisher K, and Rose R, "Range-Wide Mapping Workshop for Asian Elephants (Elephas Maximus), Cambodia, October 2008. A Report to the U.S. Fish and Wildlife Service on Assistance Award No:98210-6-G232" (Bronx: Wildlife Conservation Society, 2009).

5 World Database on Protected Areas (WDPA) – note: several major Protected Areas such as the Southern Cardamoms National Park or Prey Lang Wildlife Sanctuary are not registered to the WDPA.

6 GDANCP, "Zoning Guidelines for the Protected Areas in Cambodia" (Phnom Penh, Cambodia: General Directorate of Administration for Nature Conservation and Protected, Ministry of Environment, 2017).

Up to 1 million people are living inside PAs in Cambodia.[7] The communities inside PAs represent 6% of the country's population, which is relatively high in comparison to other countries' PAs. The average population density in PAs is 16.5 inhabitants per km^2, compared to 92 inhabitants per km^2 nationally.[8]

People inside PAs are poor but derive some benefits from the PAs. PAs in Cambodia are generally located in remote areas with poor road access and where local poverty is higher than the national average.[9,10] Although households living inside PAs suffer from lower access to health facilities, infrastructure, and markets, access to forest resources allows these households to be wealthier than those residing in similarly isolated villages outside PAs.[11] These forest resources contribute between 30-42% of rural people's total household income.[12] However, local factors, like proximity and access to forests and the level of degradation of forest resources, will impact this contribution.

Protected Areas provide critical ecosystem services to Cambodia's economy worth hundreds of millions of dollars annually. Forests in PAs provide numerous ecosystem services, including water storage, soil-erosion reduction, soil-fertility improvement, carbon

7 Based on GIS modeling using data from Facebook Connectivity Lab and Center for International Earth Science Information Network - CIESIN - Columbia University, "High Resolution Settlement Layer (HRSL)," 2016, https://www.ciesin.columbia.edu/data/hrsl/.

8 Food and Agriculture Organization and World Bank population estimates from https://data.worldbank.org/ accessed on 15 March 2021

9 World Bank, Poverty Reduction and Economic Management Sector Unit, East Asia and Pacific Region, "Poverty Profile and Trends in Cambodia. Findings from the Cambodia Socio-Economic Survey. Report No. 48618-KH." (Washington, DC: World Bank, 2009).

10 Based on a study of 40 households in three villages in three communes on the border of the Phnom Samkos Wildlife Sanctuary the ratio of poor households was of 40%, 50% and 100% compared to an average of 34% at the provincial-level. Lauren Coad, Sotheary Lim, and Lim Nuon, "Wildlife and Livelihoods in the Cardamom Mountains, Cambodia," *Frontiers in Ecology and Evolution* 7 (2019), https://doi.org/10.3389/fevo.2019.00296.

11 Tom Clements et al., "Impacts of Protected Areas on Local Livelihoods in Cambodia," World Development, Forests, Livelihoods, and Conservation, 64 (December 1, 2014): S125–34, https://doi.org/10.1016/j.worlddev.2014.03.008.

12 Glen Mulcahy and Manuel Boissière, "No Forest, No NTFPs for Rural Communities in Cambodia" (CIFOR, 2014).

Box 2. Protected Areas and Community Protected Areas

There are nine categories of PAs in Cambodia (national park, wildlife sanctuary, protected landscape, multi-purpose-use management area, biosphere reserve, natural heritage site, marine park, Ramsar site, biodiversity conservation corridors[1,2]). The MoE is responsible for managing and supervising PAs in cooperation with other institutions. Four management zones are allowed within PAs:

Core zone: areas of high conservation value with restricted access where use of natural resources is strictly prohibited.

Conservation zone: areas of high conservation value where access is allowed for Small-scale activities that support local communities such as collecting NTFPs.

Sustainable use zone: areas of high economic value where infrastructure can be developed. The use of natural resource by local peoples is allowed if the areas are designated as CPAs. This use is limited to collecting NTFPs and traditional uses at the 'family scale'.

Community zone: areas for socio-economic development for local communities and indigenous peoples that may have residential lands, agricultural fields, and gardens where land titles can be issued with MoE approval. CPAs are parts of a sustainable use zones allocated to communities residing within or adjacent to a PA. The community enters into an agreement with the MoE for 15 years.2 Community Forests (CFs) are a similar designation for land under the management of the Forestry Administration (FA) where rural communities help manage forests and can collect timber and NTFPs, including construction materials and foods.[3]

1 Royal Decree on the Protection of Natural Areas 1993, Articles 1 & 2;

2 PAs Law 2008, Article 11 & 25;

3 Sub-decree on CF Management 2003, Article 3.

sequestration, provisioning services, recreation and tourism, and air purification (Figure 1). A recent study by the World Bank showed that the ecosystem services provided by the Pursat watershed, situated largely in the Cardamom Mountains PA system, would be worth US$99 million alone.[13] Furthermore, these forests in PAs are at the core of the RGC climate change mitigation strategy, representing 59% of the commitment to emission reductions.[14]

OPPORTUNITIES FOR CONSERVATION AND DEVELOPMENT EXIST, DESPITE SEVERE PRESSURE ON PAs FROM ILLEGAL ACTIVITIES AND CLIMATE CHANGE.

The preservation of ecosystem services requires an integrated approach of innovative financing and the creation of local jobs and income. Payments for Ecosystem Services (PES) is a relatively new concept in Cambodia. However, PES for water and REDD+[15] in Cambodia – including REDD+ in the CML – have shown interesting and concrete results, but they are not yet at a large enough scale to support local communities in their livelihoods.

PA laws and regulations offer opportunities for conservation and development. PA Laws in Cambodia have strict regulations to *"... ensure management, conservation of biodiversity, and sustainable use of natural resources in protected areas"*.[16] Several zones are defined within PAs, ranging from those under strict protection to those allowing economic activity (Box 2). However, local people are permitted to remain inside PAs and to continue to practice traditional subsistence livelihoods. These communities can enter into agreements with the MoE to designate parts of the sustainable use zone as Community Protected Areas (CPA). CPAs have strict rules limiting the potential economic income that can be derived from the forest.

PAs are under severe pressure from illegal activities, such as logging, poaching, and land-use change. The combination of poverty, lack of livelihood alternatives, weak law enforcement, land speculation, and high market demand for wildlife and wood products have resulted in a "tragedy of the commons" in PAs, leading to encroachment, fragmentation of forest cover, and the depletion of forest resources. As a result, significant parts have been heavily degraded or converted to agricultural production in some PAs.

Private land titles are currently being issued for land within PAs. In July 2020, the RGC published a circular allowing households that had been living inside PAs for more than 10 years to claim a land title.[17] This reinforced a directive issued by the RGC in May 2012, which was aimed at expediting the systematic issuance of private land titles.[18] This directive resulted in over 1 million ha of land excised from state land – including 125,000 ha from PA – and allocated to over 317,000 families.[19] At the time of the report, it is not yet clear how much land will be transferred from MoE-administered PAs to provincial governments, which will then be in charge of individual land titling. This process might have both positive and negative impacts. It will certainly help clarify land tenure in PAs and CPAs, but it also has the potential to increase land grabbing.

13 Maurice Rawlins et al., "Valuing the Ecosystem Services Provided by Forests in Pursat Basin, Cambodia" (Washington, DC: World Bank, 2020).

14 "Cambodia's Updated Nationally Determined Contribution" (Phnom Penh, Cambodia: The General Secretariat of the National Council for Sustainable Development/Ministry of Environment, the Kingdom of Cambodia, 2020).

15 Reducing Emissions from Deforestation and forest Degradation, plus the sustainable management of forests. https://redd.unfccc.int/

16 Protected Areas Law 2008, Article 1.

17 Circular 06 "Granting State Property to Citizens and Civil Servants".

18 rective 01BB: Measures Reinforcing and Increasing the Efficiency of the Management of Economic Land Concessions.

19 Jean-Christophe Diepart, "The Fragmentation of Land Tenure Systems in Cambodia: Peasants and the Formalization of Land Rights," Land Tenure & Development - Country Profile N°6 (AFD (French Development Agency), June 2015).

Current climate change scenarios project severe impacts on food production and massive population displacement in the region.[20] The loss of these ecosystem services provided by PAs from illegal activity and legal titling may exacerbate these pressures. Therefore, the need to provide better jobs and income for the local population by developing and promoting conservation-friendly models of economic development in PAs is more urgent than ever.

1.1.TOWARDS CONSERVATION-FRIENDLY ECONOMIC DEVELOPMENT INSIDE PAs

In the absence of incentives for conservation-friendly business models, the current dynamics of land-use change and biodiversity loss are the logical pathways to economic development for most stakeholders. Like other frontier landscapes worldwide, the local population living in and around PAs in Cambodia suffers from unbalanced power relationships, a lack of access to financial and technical resources, aversion to risk and long-term ventures, as well as generally low organizational capacity. Besides being prone to both food and income insecurity, forest-based livelihoods typically bring a lower return on investment than non-forest-based livelihoods do. As a result, while CPA members have the highest incentive to maintain the ecosystem services provided by forests, they tend to invest their limited resources outside the CPA. These factors result in a perverse incentive for land-use change through clearing forests, and biodiversity loss through unsustainable hunting over conservation-friendly businesses. The transition from illegal unsustainable activities to conservation-friendly economic activities requires the creation of new jobs of superior quality to those that exist in the current situation.

The dynamics that drive land-use change and biodiversity loss can be addressed, to a large extent, by promoting conservation-friendly livelihoods. In several places, the agro-climatic conditions could allow farmers to engage in high-added-value crop production, which would not be possible in other parts of the country. However, most households living in PAs lack capital, time, market access, and the technical knowledge to engage in higher added-value crops. With longer distances to markets, remote farmers also tend to rely on a small number of traders who dictate prices and production. Besides, small-scale farmers are generally unable to compete against larger farms with more intensive practices and professionalized processes

Switching from non-sustainable activities to conservation-friendly economic activities requires a focus on value-added production. PAs are generally located in remote areas, with little infrastructure and a limited number of input providers. This makes conventional business models inside PAs less profitable. On the other hand, many PAs benefit from specific conditions in terms of elevation, tree cover diversity, or coastal ecosystems, allowing for high-added-value products. Overexploitation of NTFPs has also reduced the availability of products, and the remaining naturally occurring NTFPs don't offer the necessary scale needed to be viable. Diversification, cultivation, and production of high value-added products are therefore essential to achieving conservation-friendly economic development inside PAs and creating high-quality jobs to transition away from illegal non-sustainable livelihoods in PAs.

20 United Nations' Intergovernmental Panel on Climate Change's (IPCC), "Special Report on Climate Change and Land" (IPCC, 2019).

Figure 2. The two visions of economic development: a large-scale plantation (left) bordering a Community Protected Area (right) in the Cardamom Mountains.

Photo: *Yann François*

The remote location and the lack of capacity to access specialized consumer markets require communities to partner with the private sector. Partnerships with the private sector are increasingly recognized as important solutions for developing community-based forestry enterprises.[21] However, this typically requires parallel public investments in the enabling environment within PAs and CPAs (policies, improved social services, and sustainable financing). Cambodia already has a wide range of good models in place, and there is increasing interest in innovative ways for the private sector to support PA financing[22] and the development of sustainable livelihoods.[23] Engaging the private sector in landscape approaches to forest restoration has great potential to support various livelihood alternatives while increasing biodiversity and mitigating climate change.

21 USAID ProLand, "A Sourcebook for Community-Based Forestry Enterprise Programming: Evidence-Based Best Practice and Tools for Design and Implementation." (Washington, DC: USAID, 2020).

22 James E. M. Watson et al., "The Performance and Potential of Protected Areas," Nature 515, no. 7525 (November 2014): 67–73, https://doi.org/10.1038/nature13947.

23 Peter Kareiva and Michelle Marvier, "What Is Conservation Science?," BioScience 62, no. 11 (November 1, 2012): 962–69, https://doi.org/10.1525/bio.2012.62.11.5.

CONFLICTING VISIONS BETWEEN ECONOMIC DEVELOPMENT AND CONSERVATION IN PAs

The recent history of private sector development in PAs involves two contrasting visions of economic development (Figure 2). On the one hand, large-scale Economic Land Concessions (ELC) use economies of scale to undertake profitable agricultural activities. These ELCs have been accused of increasing inequalities[24] and driving land-use change[25] with minimal positive social impact.[26] However, the situation is more nuanced, with some companies having a greater social and environmental impact than others.[27] On the other hand, small-to-medium-scale enterprises are focusing on environmental and social outcomes that range from the business arms of NGOs used as vehicles to achieve their mandates[28] for businesses with strong corporate responsibility.

Cambodia has one of the most active social enterprise networks in Southeast Asia, with many pioneering models that could be expanded and implemented in other countries around the world. Although the smaller-scale approach may have a number of social and environmental advantages, it relies heavily on support from donors and can struggle to achieve sustainability.

Conflict sometimes arise between economic development and biodiversity conservation. The need to increase the quality of life of local communities and develop the economy can lead to conflicting objectives with biodiversity conservation. The differences in stakeholders' ambitions can be significant and present substantial obstacles to PA conservation. However, there are multiple pathways where these different visions can coincide. This report aims to explore some of these pathways, where the objectives of private actors, the government, conservation NGOs, and local people can coincide for shared value creation and more sustainable PA management.

24 Lisa-Marie Rudi et al., "Land Rights as an Engine of Growth? An Analysis of Cambodian Land Grabs in the Context of Development Theory," *Land Use Policy* 38 (May 1, 2014): 564–72, https://doi.org/10.1016/j.landusepol.2013.12.016.

25 Kyle Frankel Davis et al., "Accelerated Deforestation Driven by Large-Scale Land Acquisitions in Cambodia," *Nature Geoscience* 8, no. 10 (October 2015): 772–75, https://doi.org/10.1038/ngeo2540.

26 Christoph Oldenburg and Andreas Neef, "Reversing Land Grabs or Aggravating Tenure Insecurity? Competing Perspectives on Economic Land Concessions and Land Titling in Cambodia," *Law and Development Review* 7, no. 1 (October 1, 2014): 49–77, https://doi.org/10.1515/ldr-2014-0014.

27 Michael B. Dwyer, Emily Polack, and Sokbunthoeun So, "'Better-Practice' Concessions?: Lessons from Cambodia's Leopard-Skin Landscape," in *Large-Scale Land Acquisitions*, ed. Christophe Gironde, Christophe Golay, and Peter Messerli, Focus on South-East Asia (Brill, 2016), 205–28, https://www.jstor.org/stable/10.1163/j.ctt1w76v19.16.

28 Tom Clements et al., "Payments for Biodiversity Conservation in the Context of Weak Institutions: Comparison of Three Programs from Cambodia," *Ecological Economics*, Special Section - Payments for Environmental Services: Reconciling Theory and Practice, 69, no. 6 (April 1, 2010): 1283–91, https://doi.org/10.1016/j.ecolecon.2009.11.010.

02

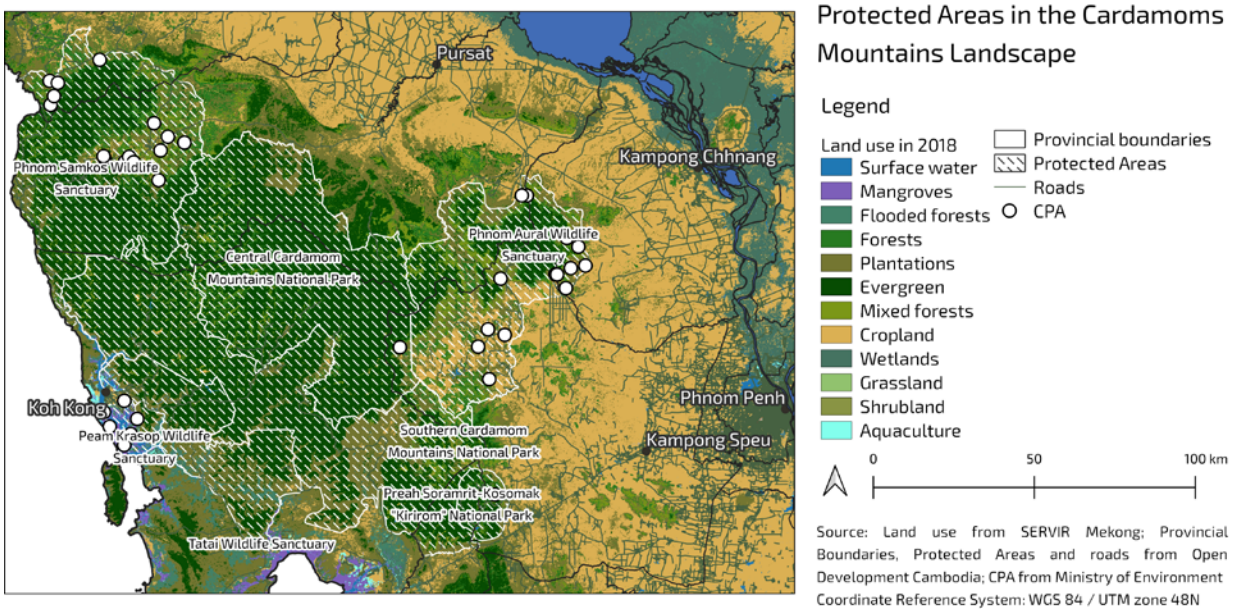
THE CARDAMOM MOUNTAINS LANDSCAPE – THE LARGEST PROTECTED AREA SYSTEM IN INDOCHINA

THE CARDAMOM MOUNTAINS LANDSCAPE IS LARGE, BIODIVERSE, AND PROVIDES CRITICAL ECO-SYSTEM SERVICES

The Cardamom Mountains landscape (CML), in southwestern Cambodia, spans five provinces and seven PAs. The landscape includes Koh Kong, Kampong Speu, Kampong Chhnang, Pursat, and Battambang Provinces, and 1.6 million ha of PAs, including national parks (Central Cardamoms, Southern Cardamoms, Kirirom, Wildlife Sanctuaries, Phnom Aural, Phnom Samkos, Peam Krasop, and Tatai) (Figure 3). Within these PAs are 39 Community Protected Areas (CPAs), representing 45,000 ha,[29] located primarily in the Phnom Aural and Phnom Samkos Wildlife Sanctuaries.

The PAs in the CML constitute the largest protected forest area in Indochina and the second largest in the entire Indo-Burma Hotspot.[30] The Cardamom Mountains Rainforest is a distinct ecoregion,[31] with a tropical, moist broadleaf forest that is among the most important landscapes for biodiversity conservation in mainland Southeast Asia. It is widely recognized as a biodiversity hotspot and home to at least 52 globally threatened species, including the world's largest populations of the critically endangered Siamese crocodile (*Crocodylus siamensis*), the endangered pileated gibbon (*Hylobates pileatus*), and the largest population of Asian elephants in Indochina with the longest wild elephant trail in Asia.[32] The landscape is also home to numerous endemic bird, amphibian, reptile, and plant species.

Figure 3. The Cardamom Mountains landscape showing the five provinces, seven Protected Areas and 39 Community PAs.



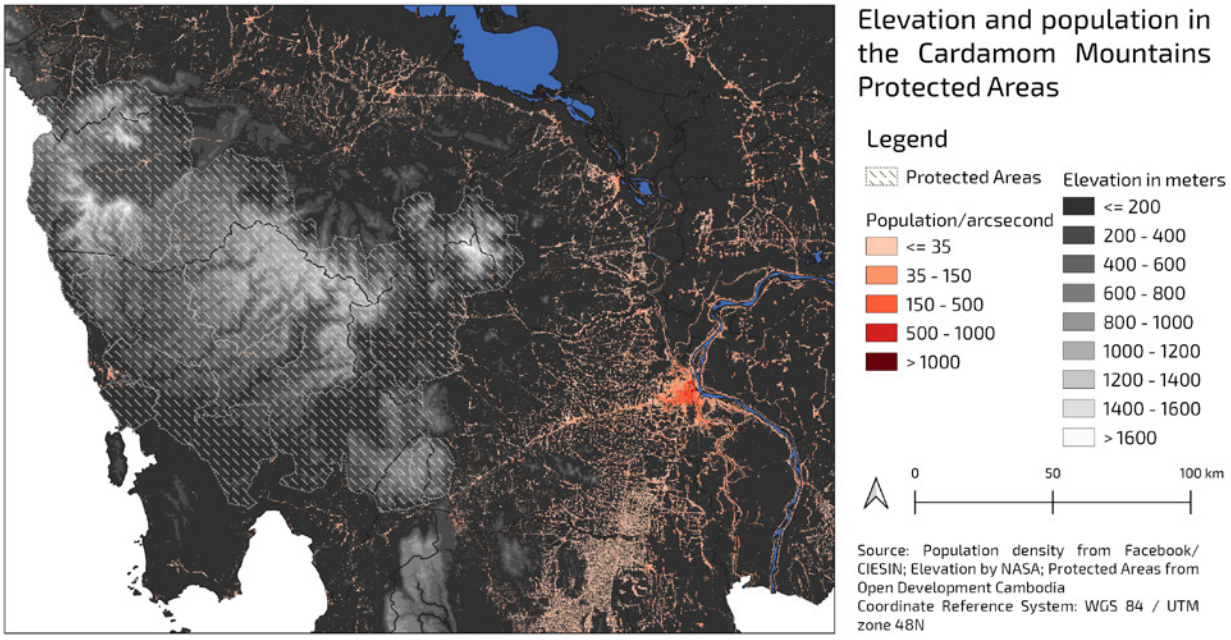
29 Source: Ministry of Environment, Community Protected Areas Database System, accessed on 28th February 2021

30 The biodiversity hotspots are 36 areas worldwide that contain more than half the world's terrestrial biodiversity on less than 3% of the Earth's land surface. The Indo-Burma Hotspot stretches from the eastern slopes of the Himalayas through Burma and Thailand to Indochina.

31 Ecoregions are geographically defined areas contain characteristic, geographically distinct assemblages of natural communities and species that are distinct from that of other ecoregions. The Cardamom Mountains rain forests (ecoregion IM0106) is one of 200 worldwide priority ecoregions for conservation. David M. Olson and Eric Dinerstein, "The Global 200: Priority Ecoregions for Global Conservation," *Annals of the Missouri Botanical Garden* 89, no. 2 (2002): 199–224, https://doi.org/10.2307/3298564.

32 Thomas Gray et al., "Status and Conservation Significance of Ground-Dwelling Mammals in the Cardamom Rainforest Landscape, Southwestern Cambodia," *Cambodian Journal of Natural History* 2017 (July 12, 2017): 38–48.

Figure 4. Human population distribution around the watersheds of the Cardamom Mountains.



Watersheds and forests in the CML provide critical ecosystem services. The wide altitudinal range of the Cardamom Mountains – from sea level to Cambodia's highest peak 1,813 m. (Figure 4) – has broad climatic and geographic features and a vast area of intact forest, resulting in a wide range of ecosystem services. A recent study by the World Bank, as part of the CSLEP project, calculated the ecosystem services provided by the Pursat watershed. The eastern slopes of the Cardamom Mountains, alone, have a net present value of US$99 million and an annual value of US$8 million from the regulation of water flows, sedimentation control, non-timber forest products, and ecotourism revenues.[33]

A RELATIVELY SMALL POPULATION, MOSTLY LIVING OUTSIDE PAs

333,000 people are living in and around the PAs in the landscape. The PAs are relatively unpopulated, with only 76,000 people (23%) living inside PAs[34] and less than half of those, about 8,461 families, involved in CPA management as registered CPA members.[35] Phnom Aural and Phnom Samkos Wildlife Sanctuaries contain two-thirds of the total population residing inside PAs. The Peam Krasop Wildlife Sanctuary hosts the highest population density, with 24.2 inhabitants per km2; 95% of people live below 250 m a.s.l. (Appendix 1, Fig. A).

Communities are heterogeneous, consisting of indigenous groups, ex-Khmer Rouge, newly arrived domestic migrants from different places in Cambodia, as well as powerful elites. At the local level, complex relationships exist between ex-Khmer Rouge, who often are village chiefs and control local land allocation, landless domestic migrants looking for land and resources, investors, provincial businessmen, indigenous people, and the government. This complex and unequal social structure is derived from a traumatic history and new economic opportunities that have shaped the social landscape. Today, the CML is one of the major "frontiers" in Cambodia, where complex economic, social, and environmental dynamics shape this landscape's future.

33 Maurice Rawlins et al., "Valuing the Ecosystem Services Provided by Forests in Pursat Basin, Cambodia" (Washington, DC: World Bank, 2020).

34 GIS analysis using data from Facebook Connectivity Lab and Center for International Earth Science Information Network - CIESIN - Columbia University, "High Resolution Settlement Layer (HRSL)," 2016, https://www.ciesin.columbia.edu/data/hrsl/.

35 Ministry of Environment, Community Protected Area database.

A NEW FRONTIER – THE HISTORICAL AND SOCIAL DYNAMICS OF THE CML

Sustainable landscape management requires understanding the past dynamics that have shaped the social landscape, followed by an exploration of potential pathways.[36]

Cambodian land-use and land rights issues are complex. That is especially true for the CML, where land tenure has been changing with each step of Cambodia's traumatic modern history.

Major social-political struggles since French colonization have marked land issues in the Cardamoms.[37] In 1970, the bombing from the Vietnam war, combined with the Khmer Rouge revolution, led many people to abandon their land. The CML remained a major Khmer Rouge stronghold until the late 1990s.

It is only since 1998, when the Khmer Rouge military and the central government came to a negotiated agreement, that these lands became accessible to the general population and other international actors. Nevertheless, the number of mines restricted access to many parts of the landscape. (See Box 3 for a brief history of recent land tenure in Cambodia).

Post-conflict, the CML became a new frontier, where land and natural resources were available for economic development by migrant landless populations as well as powerful elites, while at the same time, many international conservation NGOs arrived in this conservation hotspot. With new arrivals into the landscape in the early 2000s, the pressure on access to land increased, and people from the lowlands migrated to higher elevations looking for land and natural resources.

Box 3. A brief history of recent land tenure in Cambodia

French colonial period and the instauration of private property — Before the French Protectorate (1863 – 1953), Cambodia was not yet a territory defined by boundaries. Most of the population was living in Prey (forest in Khmer language) with little connection to the central state, and the rest of the population was living from rice farming close to the ports and other trade areas. The French regime introduced different types of land tenure, as well as a cadastral regime, which encountered resistance and was not effectively implemented. Over-taxation of farmers and the unequal land distribution between the elite and the smallholder farmers led to an increase in tension with the colonial power. Cambodia gained its independence in 1953, but land issues continued to rise. The large amount of land accumulated by a small number of landlords caused poor farmers to struggle to access property. The number of landless farmers doubled from 10% to 20% between 1960 and 1970. Increasing inequalities created a class struggle between the elite and the peasants who represented 80% of the total population.

The rise and fall of the Khmer Rouge — In 1970, less than two decades after its independence, Cambodia entered a civil war and a long-lasting political turmoil. As an increasing portion of the country became unsafe, people started migrating to Phnom Penh. At that time, a considerable amount of agricultural land was abandoned. During the Khmer Rouge administration (1975-1979) people were relocated to rural areas, family structure broke apart, most of the pre-existing state structure and private property rights were eradicated, and all the documentation created before the regime was destroyed.

36 Claude A. Garcia et al., "The Global Forest Transition as a Human Affair," *One Earth 2*, no. 5 (May 22, 2020): 417–28, https://doi.org/10.1016/j.oneear.2020.05.002.

37 Sopheak Chann, "Making Place and Creating Frontiers: Examining Land and Resource Struggles in Cambodian Post-Conflict Resource Landscapes," *The Geographical Journal*, November 13, 2019, https://doi.org/10.1111/geoj.12340.

Vietnamese occupation — In 1979 the Vietnamese invaded pushing the Khmer Rouge to the North and West of the country. During the Vietnamese occupation, land was first distributed to groups of 5 to 10 households, although local people preferred private ownership. Many households who had not returned to their land lost claim on it once back.

Transitioned to democracy — In 1991, Cambodia transitioned to democracy but the Khmer Rouge maintained strongholds, including in the Cardamoms Mountains: Aural (Phnom Aural WS), Phnom Srouch (Kirirom NP), Thma Bang (Southern Cardamoms NP), Veal Veng (Central Cardamoms NP), Koas Kralor and Samlot (Phnom Samkos WS). Without international support, the Khmer Rouge were dependent on logging and natural resource extraction as a major source of income. Their influence lasted nearly 30 years in the Cardamom Mountains until the dissolution of their last strongholds in the late 1990s.

Adapted from Sopheak Chann, "Making Place and Creating Frontiers: Examining Land and Resource Struggles in Cambodian Post-Conflict Resource Landscapes," *The Geographical Journal*, November 13, 2019

FORMALIZED TENURE PUT INCREASING PRESSURE ON LAND AND CAUSE CONFLICT AMONG STAKEHOLDERS

Land reforms defined new tenure arrangements. In 2001, the state introduced a new land law categorizing lands into state-public land, state-private land, individual-private land, and indigenous/communal land. The law extended land ownership to agricultural land and legalized land concession in state-private land through the Economic Land Concession (ELC) or Social Land Concession (SLC). ELCs were granted to companies for agro-industrial development inside the same PAs (Figure 5). The lack of land-use planning and consultations with communities in the past led to some tension between the local population, conservation NGOs, and private companies.

The Cardamom Mountains Protected Areas system still lacks agreed zoning and demarcation. This makes the entire area still vulnerable to land grabbing and encroachments. Despite the effort of conservation NGOs and MoE, the boundaries and zones are not yet final. Finalizing demarcation has become one of the main objectives of the IDA-financed CSLEP.

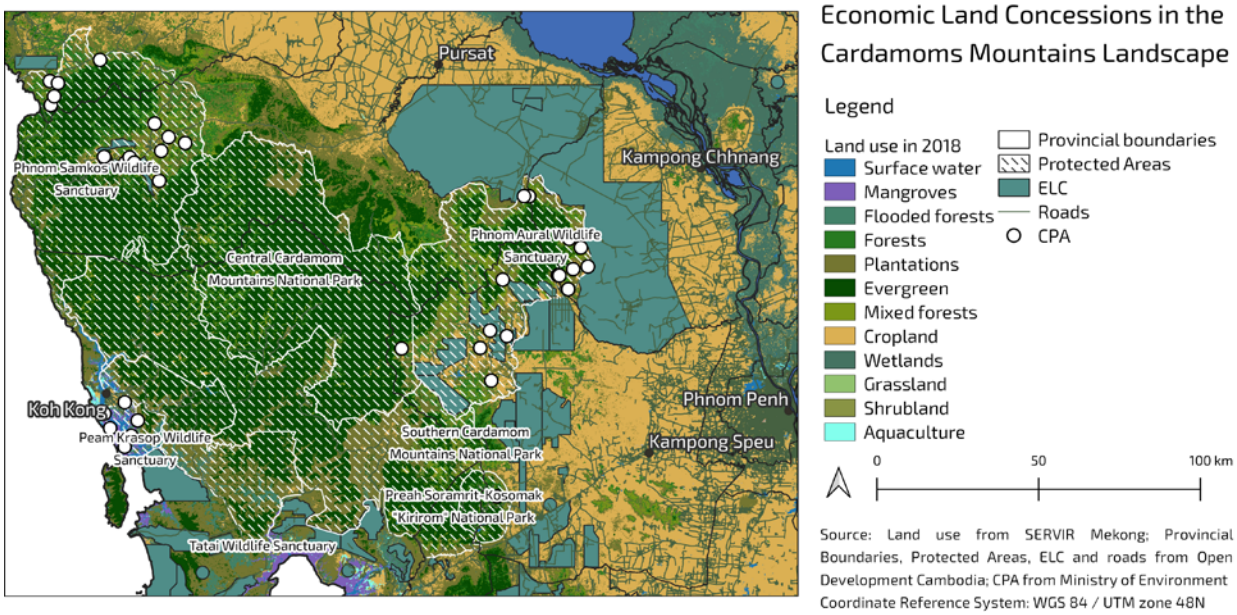
Large areas of forest have been converted to other land-uses. 90,000 ha of forests were converted to other land-uses between 2010 and 2019 within CML PAs (Figure 6). This trend is expected to continue in the near future with the reclassification of 127,000 ha of PA land in Koh Kong to grant ownership to local people[38] and a circular allowing households that have been living inside PAs for ten or more years to claim official land titles.[39] Despite significant concerns that these programs may fuel land grabbing[40], they could also increase tenure security for the many farmers lacking land titles. These programs might also help to finally reach an agreement on the boundaries of the PA system.

38 Sub-decree No. 30 on the land reclassification of 126 928.39 hectares in 8 natural protected areas in Koh Kong province as the state private property in order to grant ownership to citizens and to Koh Kong provincial administration to occupy as private state property.

39 Circular 06 on Measures and Criteria of Granting State Property to Citizens and Civil Servants.

40 The Great Koh Kong Land Rush: Areas Stripped of Protection by Cambodian Gov't Being Bought up," Mongabay Environmental News, October 7, 2021.

Figure 5. Lack of demarcation of PAs favors competing land-uses



The lowlands are at exceptionally high risk of being converted to agricultural lands. Many CPAs also suffer from a high level of land degradation, lack of land demarcation, and prevalent poverty among local communities, making CPAs vulnerable to land speculation and land grabbing. The COVID-19 crisis also put more pressure on natural resources. A recent assessment in Prey Lang[41] indicated that 70% of communities observe increased illegal extraction due to lack of income and jobs.

41 "USAID Greening Prey Lang Rapid Assessment. COVID-19 Impacts on Community Livelihoods and Natural Resources." (Burlington, Virginia, USA: Tetra Tech, July 2020).

03
LIVELIHOODS IN THE CARDAMOM MOUNTAINS LANDSCAPE

This section provides an overview of the primary sources of livelihoods covering all the communes in PAs in the CML. Given the high heterogeneity, it presents a simplified view of a complicated situation, and aims to support the design of more in-depth studies rather than provide a comprehensive livelihood assessment.

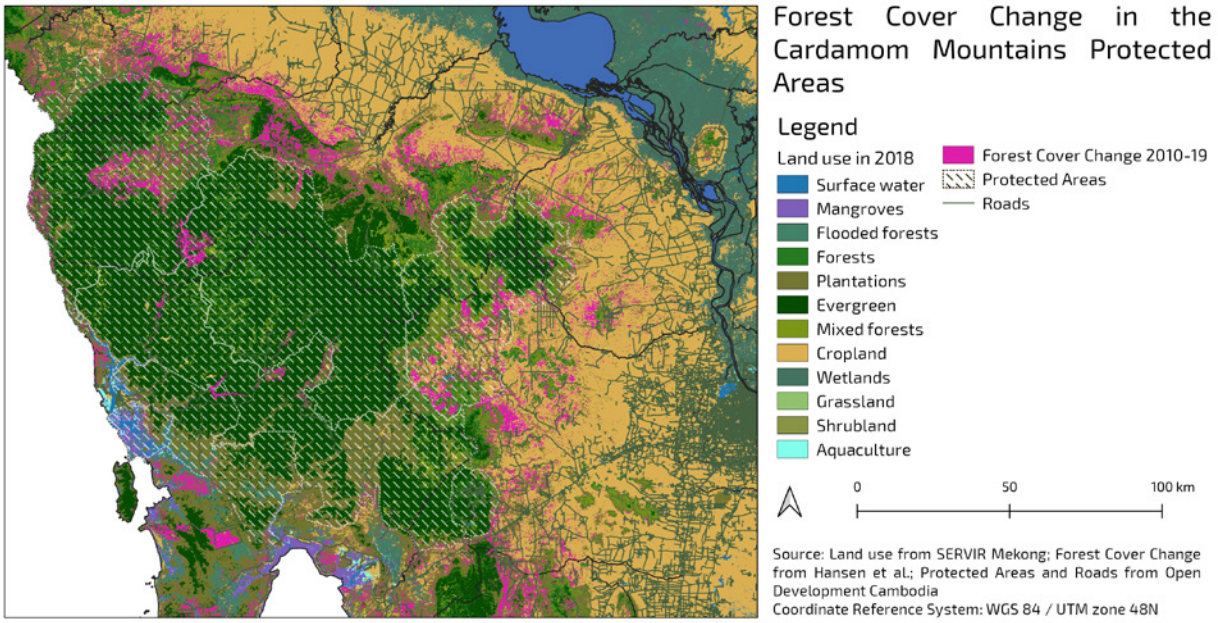
RELATIVELY POOR AND AT-RISK HOUSEHOLDS LACK ACCESS TO NATURAL RESOURCES

Lack of access to markets, healthcare, and other services makes life difficult for many households. Poor road conditions and other infrastructure in the CML put households at risk in several ways. Lack of access to healthcare facilities causes high exposure to diseases and illnesses, such as malaria and dysentery. Due to the lack of savings, few income-generating activities, and medical expenses can force households into debt or reliance on illegal activities to pay fees. Access to markets is limited, making many households dependent on a handful of traders who control prices.

The degree of poverty in the more remote areas of the landscape is significantly higher than in other rural areas. For example, in 2013 in a study of households on the border of the Phnom Samkos Wildlife Sanctuary, the average gross income per household per year was US$2,000, ranging from US$6,500 per year to only US$80 per year for the poorest households.[42] This compares to the national figure of rural income of US$3,465 in 2014.[43]

Many rural people are landless or land poor. It is estimated that 25% of the rural poor in Cambodia are landless, with 40% classified as land poor with less than 0.5 ha per household, indicating that they cannot produce enough food for subsistence.[44]

Figure 6. Forest cover change in the Cardamom Mountains Protected Areas 2010-2019. Purple shading shows a change from forest to non-forest.



42 A study of 40 households in three villages in three communes on the border of the Phnom Samkos Wildlife Sanctuary. Lauren Coad, Sotheary Lim, and Lim Nuon, "Wildlife and Livelihoods in the Cardamom Mountains, Cambodia," *Frontiers in Ecology and Evolution* 7 (2019), https://doi.org/10.3389/fevo.2019.00296.

43 Report of Cambodia Socio-Economic Survey 2019/20. National Institute of Statistics Ministry of Planning Phnom Penh, December 2020. Based on exchange rate of Riel: USD 1:0.00025.

44 Dorith v. Behaim, Marlis Lindecke, and Christian Henckes, "Foreign Direct Investment (FDI) in Land in Cambodia," Division 45 - Agriculture, Fisheries and Food (Eschborn: GIZ, December 2009).

Access to NTFPs and other forest resources provides some additional income and increased resilience to external shocks. Recent impact evaluations for PAs in Cambodia have shown that households living inside PAs have lower poverty rates than households in villages outside PAs with similar access to infrastructure.[45] However, reliance on forest resources, even if only for additional income, involves risk, particularly with rapidly changing land-use dynamics and the impacts of climate change.

Income-generating opportunities are influenced by several factors, including altitude and access to markets. The extensive altitudinal range in the CML profoundly affects income generation opportunities, with substantial variation in temperature and rainfall across the landscape affecting crop yield. In addition, livelihood opportunities in these remote areas are driven by existing value-chains and traders' requests.

Main livelihoods in the landscape include agriculture, forest products, salaried work, fisheries and aquaculture, and livestock. The most important livelihood activities for households vary across the landscape, but an overwhelming proportion of households are involved in agriculture in some form. For families in the northern Cardamom Mountains, crops are the primary source of cash income (62%) and non-cash income (41%). For cash income, salaried work (15%), forest products (12%), livestock (9%), and fishing (2%) were also significant. Forest products (37%), fishing (16%), and livestock (7%) were important for non-cash income.[46]

THE IMPORTANCE OF AGRICULTURE IN LIVELIHOODS VARIES ACROSS THE LANDSCAPE

The significance of agriculture[47] as a source of livelihood varies across the landscape. At the national level, agriculture is the primary source of livelihood in the landscape. Agricultural activity sustains the communities located in the periphery of the landscape. In these communities, paddy and temporary crops predominate. In the more forested center of the landscape, livelihoods are more balanced between agriculture and other activities, and paddy and temporary crops are less dominant. In terms of how these patterns relate to the PAs in the landscape, while agriculture is the dominant source of livelihoods around the Phnom Aural and Phnom Samkos Wildlife Sanctuaries, its importance decreases in the Central and Southern Cardamoms National Parks. In Peam Krasop Wildlife Sanctuary, fisheries are the primary source of livelihood.

Subsistence agriculture is more predominant in the West, commercial agriculture more in the East of the landscape. While households engage in agriculture mainly for home consumption ('subsistence') around Phnom Aural Wildlife Sanctuary and Kirirom National Park on the western side of the landscape, in other parts of the landscape, agriculture is more targeted towards market production. This is particularly the case in the Phnom Samkos and Peam Krasop Wildlife Sanctuaries in the East of the landscape. The Central and Southern Cardamoms National Parks in the forested center of the landscape show a lower intensity of agriculture with more balanced production, where half of the households are engaged in commercial agriculture and the other half in subsistence agriculture.

45 Tom Clements et al., "Impacts of Protected Areas on Local Livelihoods in Cambodia," World Development, Forests, Livelihoods, and Conservation, 64 (December 1, 2014): S125–34, https://doi.org/10.1016/j.worlddev.2014.03.008.

46 A study of 40 households in three villages in three communes on the border of the Phnom Samkos Wildlife Sanctuary. Cash-income (62%) included 35% for corn (maize). Non-cash income from crops (41%) included 13% garden products and 12% rice, and from forest products (37%) included 10% firewood, 6% fruit and vegetables and 4% wild meat). Lauren Coad, Sotheary Lim, and Lim Nuon, "Wildlife and Livelihoods in the Cardamom Mountains, Cambodia," F*rontiers in Ecology and Evolution* 7 (2019), https://doi.org/10.3389/fevo.2019.00296.

47 In terms of livelihoods, agriculture is defined here as households engaged in crop production on more than 0.03 ha and/or with livestock production of at least two large livestock and/or three medium livestock and/or 25 poultry. "Temporary crops" refers to short-rotation crops such as maize, cassava, turmeric, or pumpkin. "Permanent crops" refers to things such as mango, durian, and banana.

RICE CULTIVATION IS AN ESSENTIAL LIVELIHOOD ACTIVITY

Rice cultivation remains the main livelihood activity for around half of the adult population. Based on data from Commune Database[48], rice cultivation is declining, nationally and in the CML (Figure 7). Still, it remains an important livelihood activity and the primary source of livelihood in the lower altitude areas of the landscape. Temporary crops are important for a small proportion of households.

TEMPORARY CROPS ARE IMPORTANT FOR A SMALL PROPORTION OF HOUSEHOLDS

The cultivation of short-rotation crops, or temporary crops, such as maize, cassava, turmeric, and pumpkin, is important for a small but stable proportion of households in the landscape. Temporary crop production is especially crucial in Phnom Samkos, Phnom Aural Wildlife Sanctuary, and the Central and Southern Cardamoms National Parks.

PERMANENT CROPS SEEM TO BE INCREASING IN IMPORTANCE

Cultivation of permanent crops is a source of livelihood for an increasing number of households in the landscape. Between 2011 and 2017, the proportion of farmers relying on permanent crops, such as mango, durian, banana, and longan, has been steadily increasing (Figure 7). This livelihood activity is especially important in the Central and Southern Cardamoms National Parks, Phnom Aural, and Peam Krasop Wildlife Sanctuaries.

ILLEGAL ACTIVITY IS IMPORTANT BUT DIFFICULT TO QUANTIFY

There is little quantitative data on the importance of illegal activities for livelihoods. The contribution of illegal activities, such as logging, charcoal production, and poaching to household income is difficult to quantify, given the sensitivity of the issue for respondents. Still, qualitative reports indicate that it is widespread. Conservation NGOs have reported that income from logging was a significant barrier to engaging households in conservation-friendly income generation activities, which tend to be less lucrative and have a longer and uncertain return on investment. One study adjacent to a PA did not ask about illegal logging, but households reported wildmeat being 2% and 4% of the cash and non-cash income, respectively.[49]

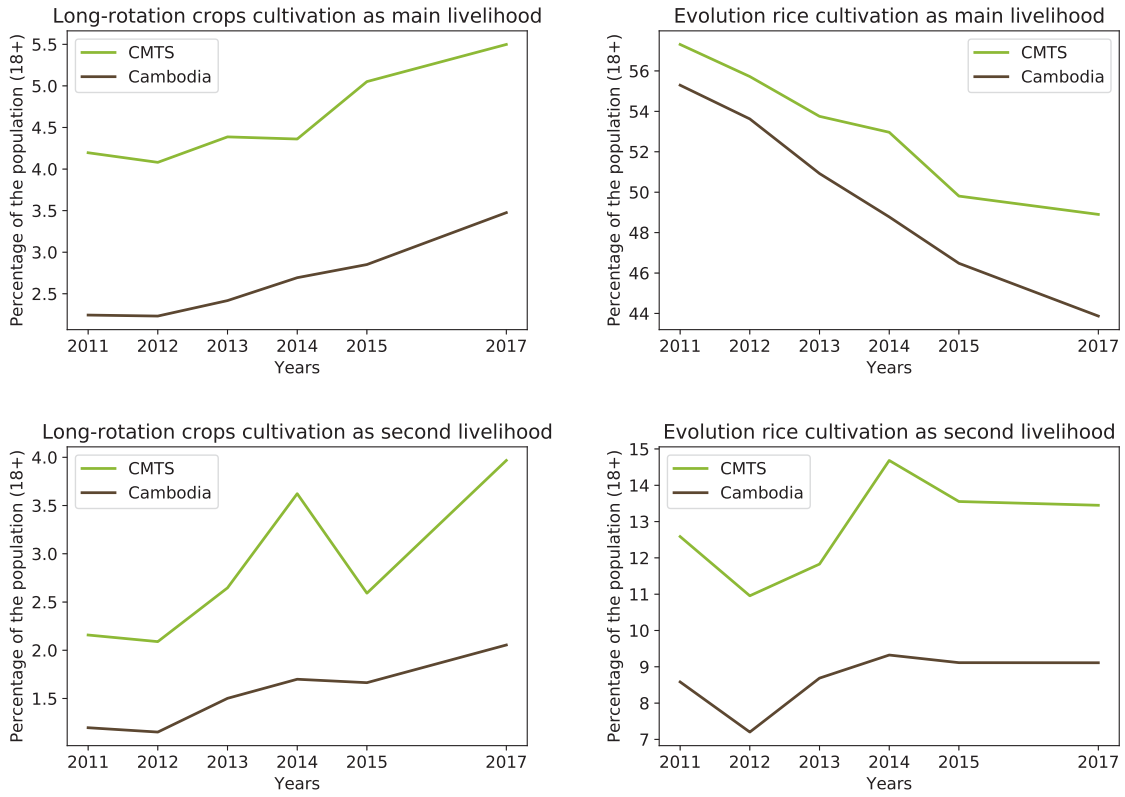
Charcoal production is significant and relies on illegally gathered timber. According to the Agricultural Census 2013, more than 27,000 households are involved in charcoal production, besides agricultural activities, for Battambang, Pursat, Kampong Chhnang, Kampong Speu, and Koh Kong provinces, only.[50] Considering that a significant proportion of charcoal producers are not engaged in agriculture, the actual figure is likely significantly higher.

48 Commune Database, NCDD. http://db.ncdd.gov.kh/

49 A study of 40 households in three villages in three communes on the border of the Phnom Samkos Wildlife Sanctuary found 80% of households hunted at least 38 different mammal, bird, and reptile species. For most households hunting was to prevent crop-raiding, or opportunistically, rather than to supply the commercial trade. Lauren Coad, Sotheary Lim, and Lim Nuon, "Wildlife and Livelihoods in the Cardamom Mountains, Cambodia," *Frontiers in Ecology and Evolution* 7 (2019), https://doi.org/10.3389/fevo.2019.00296.

50 National Institute of Statistics and Ministry of Agriculture, Forestry and Fisheries, "Agricultural Census 2013" (Phnom Penh, Cambodia: Ministry of Planning, December 2015).

Figure 7. Changes in long-rotation crops (left) and rice cultivation (right) as (a) primary, and (b) second livelihoods for communes in Cambodia and the Cardamom Mountains landscape.



Data: *Commune Database, NCDD*

COLLECTION OF NTFP IS SEASONAL, BUYER-LED, AND IN DECLINE

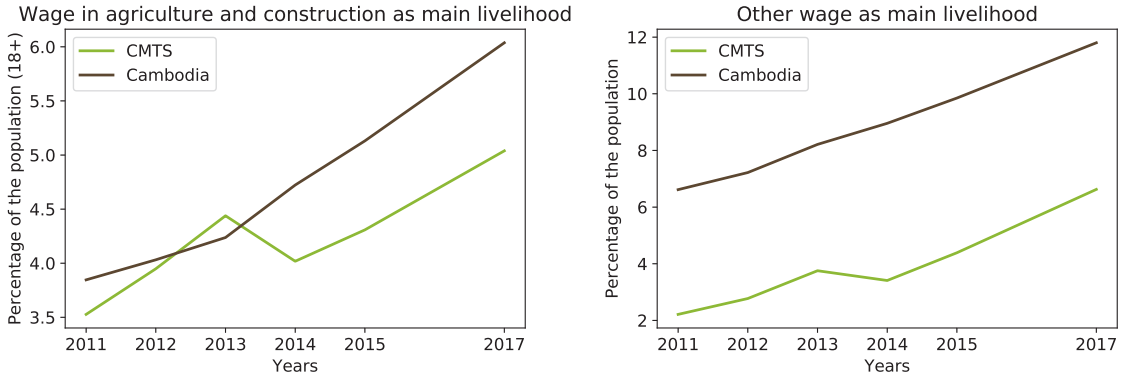
Similar to the previous section, the importance of the collection and processing of non-timber forest products, here understood as Non-Wood Forest Products (cf. chapter on NTFP), remains widely unknown. A review of existing literature seems to indicate that it is a very seasonal, often buyer-led activity, and is generally in decline. Numerous reports also indicate that NTFP production is decreasing in many areas due to forest degradation and deforestation.

A small fraction of the population relies on NTFP for their livelihoods. Less than 2% of households in the CML have NTFP as their primary livelihood, with a similar percentage reporting it as a secondary livelihood. Communities that rely on NTFPs are also likely to be among the most vulnerable, including landless and marginalized communities.

WAGES AND REMITTANCES ARE IMPORTANT SOURCES OF INCOME

The development of commercial farms by outside investors is increasing the significance of labor wage as a source of income. Between 2011-2017, the percentage of households with wages as the main livelihood source more than doubled, with growth in agriculture, construction, and other wages (Figure 8). This source of income is especially important for the landless members of the community who mainly rely on daily labor for their livelihoods.

Figure 8. Wages from (a) agriculture and construction, and (b) other sources as a primary source of livelihoods in the Cardamom Mountains landscape.



Data: *Commune Database, NCDD*

Remittances from domestic and international migrants are also a significant and fast-growing source of income. The remittances from household members leaving the landscape to work in the construction industry, the garment industry, or in a fishery serve as the primary livelihood source for 10% of households in the landscape (Figure 9). This source of livelihood is likely to have been especially impacted by the COVID-19 crisis, as these industries have been hit hard by the crisis.

3.1. COVID-19 IS IMPACTING LIVELIHOODS IN THE CML

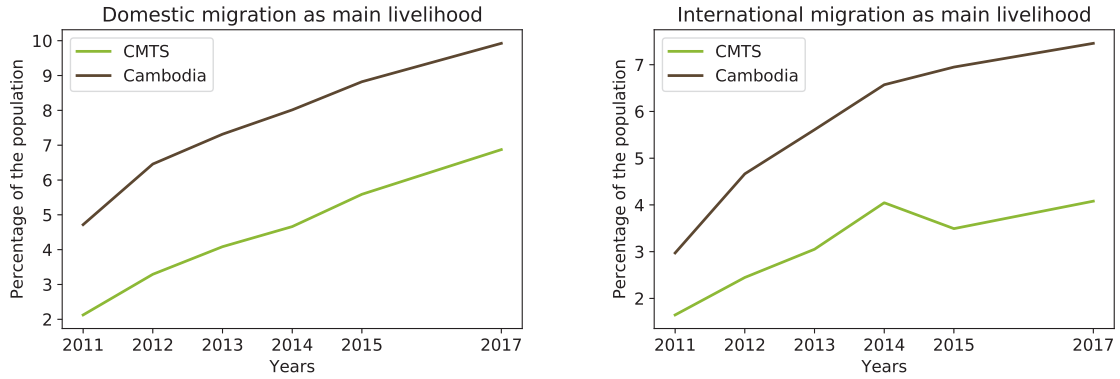
Impacts of the global economic crisis are expected to be severely felt in Cambodia. The three pillars of the Cambodian economy — tourism, manufacturing exports, and construction— have been profoundly impacted by COVID-19. These pillars represented nearly 40% of the paid employment in 2019. Initially, the tourism sector in Cambodia was impacted the most. As the pandemic continued, postponement and cancellation of garment and footwear orders severely affected the garment industry as well. More recently, the reduction of foreign direct investment, especially from China, which represented 40% of the foreign direct investment, has significantly affected the construction sector.

The COVID-19-induced economic crisis is at risk of reversing years of development gains in Cambodia. While Cambodia's real gross domestic product (GDP) growth was at 7.1% in 2019, it decreased significantly to -3.1% in 2020 (however, it is also projected to have a recovery of 4% in 2021). As a result, employment declined by over 13% in 2020, despite an unprecedented intervention by the RGC accounting for 5 percent of GDP.[51] Such a recession has not occurred in Cambodia in more than 30 years.

Labor income has been a significant driver of poverty reduction in Cambodia. However, most of the people who escaped poverty did so by a little margin, and The World Bank estimates that around 4.5 million people remain near-poor and vulnerable to falling back into poverty when exposed to economic and other external shocks. Particularly, it is estimated that the economic slowdown brought about by COVID-19 could lead to an increase in poverty of between 5.4 and 6.0 percentage points in the absence of significant mitigation measures. (This estimate was established prior to the current COVID-19 outbreak in Cambodia, which began in

51 World Bank Cambodia Economic Update, Dec 2020: Cambodian Economy Hit Hard by Pandemic but Projected to Recover in 2021

Figure 9. Remittances from (a) domestic, and (b) international migrants as a primary source of livelihoods in the Cardamom Mountains landscape.



Data: *Commune Database, NCDD*

February 2021, and represents the worst outbreak since the pandemic's onset. Therefore, it is likely that this estimate understates the full impact of the crisis).

Livelihoods in the CML are likely to be impacted. The loss of direct income from the agricultural sector, as well as the loss of remittances from domestic and international migrants working in affected sectors such as the tourism, construction, and garment sectors, will impact households in the CML. For example, income from migrant household members declined by 42% in 2020 compared to the pre-COVID-19 outbreak.[52]

COVID-19 IMPACTS ON THE AGRICULTURE SECTOR HAVE BEEN VARIABLE

The impact of COVID-19 on the agricultural sector depends on the product. On the one hand, exports of jasmine rice have increased[53], whereas demand for high-quality vegetables — purchased by hotels and restaurants— decreased. Similarly, the closure of processing factories and borders led to a price decrease for products like mango[54] and cashew.[55] Despite this, compared to other sectors, the agricultural sector has been relatively unscathed and is a pillar of resilience for households suffering from job losses and other decreases in income.

THE TOURISM SECTOR IN CAMBODIA HAS BEEN THE MOST HEAVILY IMPACTED BY COVID-19

Tourism represents 33% of the GDP in Cambodia and accounts for millions of jobs. Direct, indirect, and induced employment from the tourism sector is estimated at 2.9 million jobs in Cambodia.[56] The impact of COVID-19 on the tourism sector is illustrated by the crash in sales of tickets to Angkor Wat, from over US$10 million in January 2020 to a few thousand dollars from April 2020 until now (Figure 10).

52 Sodeth Ly et al., "Cambodia Economic Update : Restrained Recovery - Special Focus Adapting to COVID-19 in an Uncertain World," Cambodia Economic Update (Washington, DC: World Bank, 2020).

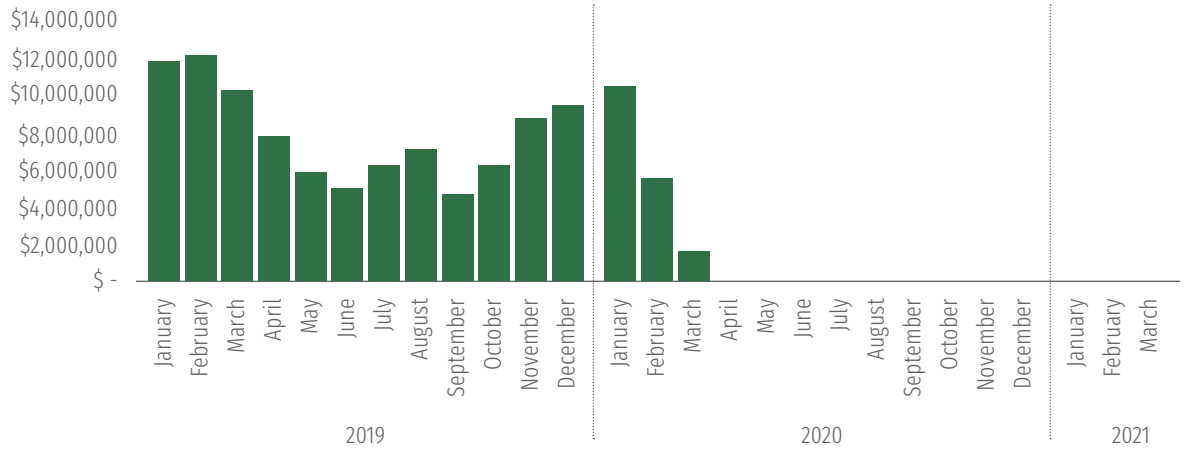
53 "Cambodia in Quarantine: A Return to the Fields," Southeast Asia Globe, August 11, 2020, https://southeastasiaglobe.com/a-return-to-the-fields/.

54 "Agriculture Ministry to Look into Declining Mango Prices," *Khmer Times* (blog), April 12, 2020, https://www.khmertimeskh.com/712217/agriculture-ministry-to-look-into-declining-mango-prices/.

55 "USAID Greening Prey Lang Rapid Assessment. COVID-19 Impacts on Community Livelihoods and Natural Resources." (Burlington, Virginia, USA: Tetra Tech, July 2020).

56 World Travel and Tourism Council (UNWTO)

Figure 10. Angkor Archaeological Park entry revenues showing a 99% drop in the last 12 months compared to 2019.



Source: *Angkor Enterprise*

Domestic tourism has increased, but not by enough to save some businesses. The low numbers of COVID-19 cases in Cambodia led to a rise in domestic tourism and a quick recovery of the local tourism sector. However, the impact on the industry has been very severe, and many actors might not be able to survive a long-term drop in tourism. Globally, international arrivals dropped by 74% in 2020, with an 84% drop in the Asia-Pacific region.[57] Industry experts do not expect any rebound before 2022.

Ecotourism remains in a fragile state but is predicted to bounce back. The impact of the decrease in ecotourism activities on the landscape is hard to quantify at this point. On the one hand, domestic tourism was not greatly impacted until recently, and before the February 20 COVID-19 outbreak and the subsequent lockdown, some high-end ecotourism destinations managed to attract wealthy Cambodians who otherwise would have traveled internationally. Nature-based tourism is expected to see growing demand after the crisis. An increase in Chinese solo travelers is expected and is likely to lead to a higher demand for ecotourism.[58] However, many ecotourism sites remain at risk, with many actors in the value chain being negatively impacted (e.g., taxi and bus drivers, souvenir vendors, guides, etc.). While some ecotourism actors may survive due to domestic tourism, the loss of direct income and remittances from the tourism sector will likely have a substantial impact on the landscape.

IMPACTS FROM COVID-19 ON THE MANUFACTURING AND CONSTRUCTION SECTORS WILL REDUCE REMITTANCES TO THE CML

A rapid drop in demand for garments, footwear, and travel goods led to the cancellation and postponement of orders. By June 2020, 450 factories suspended their operations, while 83 had officially closed, leaving only 50% of the factories in operation and 130,000 people unemployed[59]. While this sector will rebound, the short-term loss of remittances from migrant workers, mainly women, will substantially impact the CML.

57 NWTO, "2020: Worst Year in Tourism History with 1 Billion Fewer International Arrivals," accessed March 4, 2021, https://www.unwto.org/news/2020-worst-year-in-tourism-history-with-1-billion-fewer-international-arrivals.

58 Maurice Rawlins, Werner Kornexl, and Sumit Baral, "Enabling Ecotourism Development in Cambodia" (Washington, DC: World Bank, 2020).

59 "Cambodia in Quarantine: Locking the Factory Doors," Southeast Asia Globe, August 10, 2020, https://southeastasiaglobe.com/cambodia-garments-covid-19/.

The impact of COVID-19 led to a significant decrease in foreign direct investment affecting the construction sector. While most large-scale construction projects are still ongoing, there is a deep concern that COVID-19 may have burst a bubble on the high-end construction market and that the upcoming years will show a sharp reduction in new projects[60]. The impact on the estimated 200,000 jobs of the sector is likely to be more modest than the impact on the labor-intensive garment, footwear, and travel goods industries. Like the previous sectors, the construction sector has been powered by rural migrant workers whose families rely on remittances.

INTERNATIONAL REMITTANCES ARE SIGNIFICANT IN THE CML AND HAVE DROPPED SUBSTANTIALLY BECAUSE OF COVID-19

The level of remittances to low and middle-income countries is predicted to drop by 20% in 2020[61]. In 2019, Cambodia received US$1.6 billion in remittances, representing 5.9% of the GDP. Migrants in areas affected by lockdowns and working in sectors impacted by the economic crisis will suffer the most. For Cambodia, this is especially concerning for migrants to Thailand who account for 93% of migrant workers.[62] Around 90,000 Cambodian migrant workers have already returned from Thailand, including to provinces in the CML.[63] Given the importance of international remittances in the CML, (Figure 9) this downturn will likely have a significant impact on livelihoods in the landscape.

PRE-EXISTING INDEBTEDNESS

The loss of jobs and incomes is particularly concerning, given the high level of indebtedness of the local population. Pre-COVID19 economic development in Cambodia increased the population's confidence in the stability of their household incomes and their ability to service loans from microfinance institutions (MFI). 2.6 million Cambodian borrowers are holding more than US$ 10 billion of microfinance debt (around 40% of the GDP). With an average level of MFI debt of US$ 3,804 per borrower, Cambodia has the highest level of MFI debt in the world, higher than the annual average wage was in 2017.[64] Unpublished reports suggest that 50% of the MFI borrowers are over-indebted.[65] In the CML, the level of household debt can also exceed 100% of annual incomes (Figure 11). A significant share of the loans is used to cover medical expenses and food supplies, rather than for investing in assets.[66]

Much of household debt is collateralized by land titles. The high risk of losing collateralized land or homes due to defaulting on debt leads people to make risky decisions,[67] including involving themselves in illegal activities, such as poaching, logging, charcoaling, and land clearing.[68]

In remote areas of the CML, most debt is to intermediaries, crop buyers, relatives, grocery store owners, and wealthier households in the village. In these remote areas, because there are few providers, there are also low levels of debt to MFIs. While the government has been asking MFIs to provide flexibility in the repayment of the loans, those with informal loans are less likely to benefit from these measures.

60 "Cambodia in Quarantine: Hanging up the Hard Hat," Southeast Asia Globe, August 12, 2020, https://southeastasiaglobe.com/hanging-up-the-hard-hat/.

61 Migration and Remittances Team - World Bank, "COVID-19 Crisis Through a Migration Lens," Migration and Development Brief (Washington, DC: World Bank, April 2020).

62 "General Population Census of the Kingdom of Cambodia 2019 - Final Census Results" (Phnom Penh, Cambodia: National Institute of Statistics, Ministry of Planning, October 2020).

63 Driven Out: One Village's Experience with MFIs and Cross-Border Migration," Briefing Paper (Phnom Penh, Cambodia: LICADHO, May 2020).

64 Average monthly salary of 1,039,000 Riels in 2017 according to Cambodia Socio-economic Survey, National Institute of Statistics.

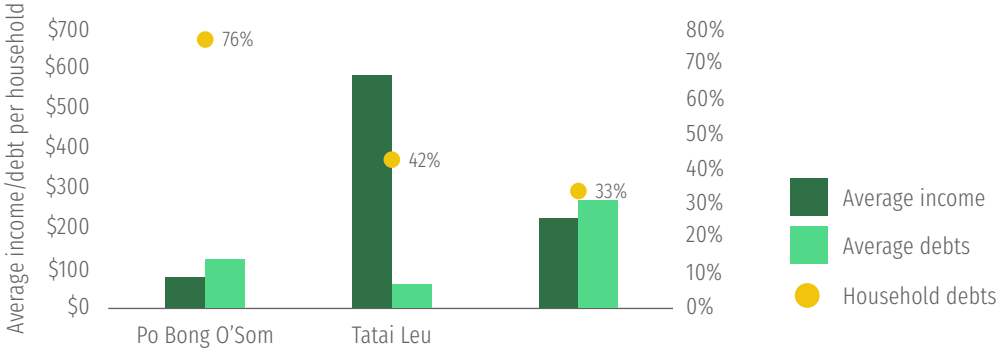
65 "Collateral Damage: Land Loss and Abusers in Cambodia's Microfinance Sector" (Phnom Penh, Cambodia: LICADHO and Sahmakun Teang Tnaut, August 2019).

66 Fauna & Flora International, unpublished data.

67 "Debt and the Migration Experience: Insights from South-East Asia" (Bangkok, Thailand: IOM, 2019).

68 Sopheak Chann and Tim Frewer, "Commodity Frontiers - An Ethnographic Study of Social-Environmental Interaction of Upper Stung Prek Thnot River Catchment, Eastern Cardamom Mountains" (Phnom Penh, Cambodia: UNDP, July 2017).

Figure 11. Level of debts in rural communes of the CML.



Data: *Fauna & Flora International, unpublished*

IMMIGRATION INTO THE CML BECAUSE OF COVID-19 JOB LOSSES WILL PUT FURTHER PRESSURE ON NATURAL RESOURCES

At the national and regional levels, reports of poaching and illegal logging due to immigration and loss of livelihoods are increasing. Both workers who have returned from domestic and international work and migrants forced from more populated provinces can increase pressure on natural resources in the CML. Such trends have already been observed in other countries of the Indo-Pacific region and are putting additional pressure on natural resources and local food systems.[69]

RGC RESPONSE TO COVID-19

The RGC implemented several measures to mitigate the impact of COVID-19 on livelihoods. To support the poorest populations, the RGC started providing direct cash transfers in June 2020. As of October 2020, 2.6 million people from 640,000 households have benefited from the program, with monthly spending of US$30 million.[70] For unemployed workers in the garment, footwear, and travel goods sectors, the government introduced an unemployment benefit of US$70 per month, with US$40 paid by the government and US$30 paid by the factories. Unemployed (formal) workers in the tourism sector will also receive an unemployment benefit of 20% of the minimum wage, valued at around US$40 per month. Finally, the RGC implemented various tax relief efforts to support the most affected sectors. These measures have significantly mitigated the impacts of COVID-19, in terms of poverty, and will offset some of the negative impacts on livelihoods detailed above.

69 Todd Sanderson et al., "Food Systems Security, Resilience and Emerging Risks in the Indo-Pacific in the Context of COVID-19: A Rapid Assessment," ACIAR Technical Reports (Canberra, Australia: Australian Centre for International Agricultural Research (ACIAR), 2020).

70 Sodeth Ly et al., "Cambodia Economic Update : Restrained Recovery - Special Focus Adapting to COVID-19 in an Uncertain World," Cambodia Economic Update (Washington, DC: World Bank, 2020).

3.2. CLIMATE CHANGE IS THE MOST SEVERE THREAT TO LIVELIHOODS IN THE CML

THE IMPACTS OF CLIMATE CHANGE WILL BE SEVERE AND WILL IMPACT ALREADY MARGINALIZED PEOPLE AND THE NATURAL RESOURCES ON WHICH THEY DEPEND

The impacts of climate change are going to be significant in the coming decades. Recent predictions of an increase in global temperature of 2.6-3.9°C by 2060[71] rule out the possibility of a mild change in the climate.

Natural ecosystems will be under significant pressure. From 1.5°C of warming, the risk of wildfires becomes high. From 3°C, there is a high probability of severe and irreversible wildfires. Wildfires and other causes of forest loss are likely to most severely impact already marginalized populations who rely on forests for their livelihoods. Similarly, species already threatened by habitat loss and poaching will be at most risk from climate shocks. At a larger scale, loss of ecosystem services will occur because of the lower productivity of forests due to higher temperatures and reduced water regulation that occur as a result of a higher frequency of extreme weather events.

CROP LOSSES AND MASS POPULATION DISPLACEMENT IN SOUTHEAST ASIA DUE TO CLIMATE CHANGE

Southeast Asia will be particularly affected by climate change with threats to the stability of food systems. An increase by 1.5-°C of the global mean temperature, representing locally between a 1.6-2.6°C increase in land temperature, will threaten crop yields in Southeast Asia. With an increase of 3-4°C of the global mean temperature, crop loss in the region may reach 60%. Such disruptions are likely to lead to massive population displacement.[72]

Compared to 2000, by 2050, days that exceed human thermoregulatory capacity will double. This increase in the number of days in which the combined humidity and temperature exceed human thermoregulatory capacity will result in increasingly lethal heat events, thus threatening many human activities in the area.[73]

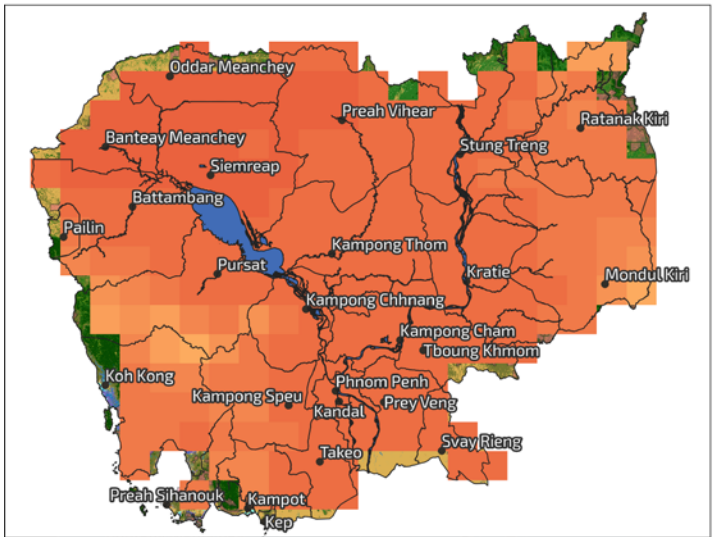
There is a need for climate-smart models of development. Given the projected impacts of climate change on the landscape (Figure 12), it is crucial to develop models that contribute to climate change mitigation while also building resilience to the coming climate shocks. Such models should either support carbon sequestration in the landscape or support the switch to a low-carbon economy in Cambodia. In addition, they should contribute to the restoration of ecosystems and diversity of livelihoods to increase households' resilience to climate hazards.

71 S. Sherwood et al., "An Assessment of Earth's Climate Sensitivity Using Multiple Lines of Evidence," *Reviews of Geophysics*, July 25, 2020, e2019RG000678, https://doi.org/10.1029/2019RG000678.

72 United Nations' Intergovernmental Panel on Climate Change's (IPCC), "Special Report on Climate Change and Land" (IPCC, 2019).

73 Camilo Mora et al., "Global Risk of Deadly Heat," *Nature Climate Change* 7, no. 7 (July 2017): 501–6, https://doi.org/10.1038/nclimate3322.

Figure 12. Average high daily temperature for Cambodia. Climate change projections under the RCP 8.5 scenario



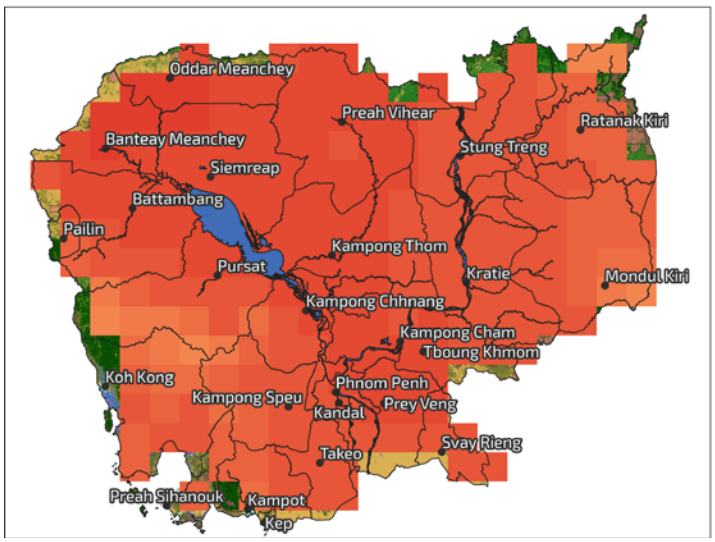
Average high daily temperature during period 2046 - 2065

Legend

25 - 26 °C	33 - 34 °C
26 - 27 °C	34 - 35 °C
27 - 28 °C	35 - 36 °C
28 - 29 °C	36 - 37 °C
29 - 30 °C	37 - 38 °C
30 - 31 °C	38 - 39 °C
31 - 32 °C	> 39 °C
32 - 33 °C	

0 100 200 km

Source: Climate Projection from ensemble models from CCAFS, administrative boundaries from Open Development Cambodia
Coordinate Reference System: WGS 84 / UTM zone 48N



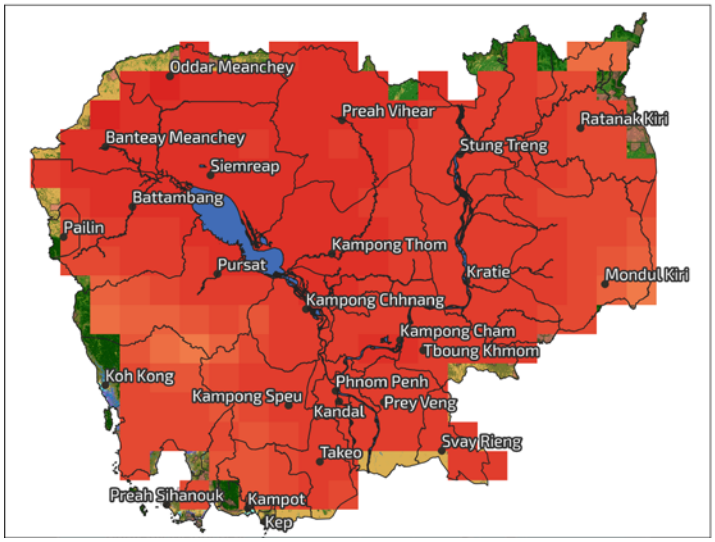
Average high daily temperature during period 2046 - 2065

Legend

25 - 26 °C	33 - 34 °C
26 - 27 °C	34 - 35 °C
27 - 28 °C	35 - 36 °C
28 - 29 °C	36 - 37 °C
29 - 30 °C	37 - 38 °C
30 - 31 °C	38 - 39 °C
31 - 32 °C	> 39 °C
32 - 33 °C	

0 100 200 km

Source: Climate Projection from ensemble models from CCAFS, administrative boundaries from Open Development Cambodia
Coordinate Reference System: WGS 84 / UTM zone 48N



Average high daily temperature during period 2081 - 2099

Legend

25 - 26 °C	33 - 34 °C
26 - 27 °C	34 - 35 °C
27 - 28 °C	35 - 36 °C
28 - 29 °C	36 - 37 °C
29 - 30 °C	37 - 38 °C
30 - 31 °C	38 - 39 °C
31 - 32 °C	> 39 °C
32 - 33 °C	

0 100 200 km

Source: Climate Projection from ensemble models from CCAFS, administrative boundaries from Open Development Cambodia
Coordinate Reference System: WGS 84 / UTM zone 48N

04
OPPORTUNITIES FOR CONSERVATION-FRIENDLY ECONOMIC DEVELOPMENT

This section of the report will focus on Conservation-friendly economic activities (CFEA). These models should directly or indirectly contribute to the protection and restoration of biodiversity and ecosystem services, mitigate and build resilience to climate change, and improve the local communities' livelihoods.

CURRENT MODELS FOR RURAL DEVELOPMENT IN CAMBODIA DO NOT CONTRIBUTE TO LONG-TERM SUSTAINABILITY

The scale of challenges posed by climate change and loss of ecosystem services requires new development models in human-dominated parts of PAs. The various forms of private sector partnerships implemented in Cambodia have contributed to the country's impressive economic development in previous decades, but it relied, to a considerable extent, on natural resources and contributed to high rates of environmental degradation while also increasing inequalities. The Nationally Determined Contribution (NDC) commits itself to more climate-smart agriculture and to a significant increase in forest cover. Among these "nature-based solutions", forest restoration through agroforestry is identified as the most cost-effective option for storing carbon and gaining some time to achieve the necessary fundamental changes in society and in the economy.[74,75]

Engaging the private sector is critical to achieving real conservation impact.[76] Given the financial gaps and the underlying barriers to developing sustainable business models by local communities, private sector investment will be crucial for more sustainable business models if PAs are to remain viable. Acknowledging that more fundamental changes are needed to achieve conservation and development impacts,[77] partnerships between communities and the private sector can be important tools in a landscape approach to the management of PAs.

Developing conservation-friendly businesses is beyond the capacities of many CPAs. Investing in CFEA requires access to finance, technical know-how, organizational capacity, and acceptance of a long-term return on investment. These characteristics are infrequently found among CPAs, which also suffer from highly restrictive regulations. Conversely, the entrepreneurial and innovative Cambodian business scene, along with the emergence of funds for investing in "nature-based solutions" and land restoration projects, offer an interesting opportunity to develop new development models in human-dominated parts of PAs.

Conservation-friendly economic activities complement direct public support to local communities. CFEA does not replace the need for technical assistance to communities to develop community enterprises, nor replace the need for other public services in these areas. The role of MoE is to promote sustainable models of economic development, set up rules and procedures similar to those of ecotourism projects, and at the same time facilitate coordination between communities and the private sector.

The following sections present possible models that can contribute to achieving these outcomes and some of the mechanisms that can enable them.

74 Jean-Francois Bastin et al., "The Global Tree Restoration Potential," *Science* 365, no. 6448 (July 5, 2019): 76–79, https://doi.org/10.1126/science.aax0848.

75 Jean-François Bastin, "Erratum for the Report: 'The Global Tree Restoration Potential' by J.-F. Bastin, Y. Finegold, C. Garcia, D. Mollicone, M. Rezende, D. Routh, C. M. Zohner, T. W. Crowther and for the Technical Response 'Response to Comments on "The Global Tree Restoration Potential"' by J.-F. Bastin, Y. Finegold, C. Garcia, N. Gellie, A. Lowe, D. Mollicone, M. Rezende, D. Routh, M. Sacande, B. Sparrow, C. M. Zohner, T. W. Crowther," *Science* 368, no. 6494 (May 29, 2020), https://doi.org/10.1126/science.abc8905.

76 Peter Kareiva and Michelle Marvier, "What Is Conservation Science?," *BioScience* 62, no. 11 (November 1, 2012): 962–69, https://doi.org/10.1525/bio.2012.62.11.5.

77 Bram Büscher and Robert Fletcher, "Towards Convivial Conservation," *Conservation and Society* 17, no. 3 (July 1, 2019): 283–96, https://doi.org/10.4103/cs.cs_19_75.

4.1. PLANTATION FORESTRY IS A FAST-GROWING SECTOR IN CAMBODIA

Cambodia has the second-highest rate, globally, of increased planted forest area. Despite the challenge of encroachment and forest fragmentation of natural forests, between 2010-2020, planted forest area in Cambodia has grown by 14.6% annually, the highest growth rate in the world after Nicaragua.[78]ZZZ

Plantations on degraded lands are promoted to address the timber supply gap in the region. They are also important for the creation of rural jobs and contribute to climate mitigation. However, commercial tree plantations, even on degraded land, could also create negative impacts on ecosystem services[79], if not done sustainably. In the context of PAs and biodiversity corridors, two types of approaches seem feasible: High-value timber species, such as teak, and short-rotation tree species, such as acacia and eucalyptus.

HIGH-VALUE TIMBER PLANTATIONS HAVE RESTRICTIVE CAPITAL REQUIREMENTS AND LONG CROP CYCLES

Salvage logging in Economic Land Concessions and from infrastructure development projects used to represent 90% of the legal timber supply for domestic and export markets.[80] The moratorium of new ELCs will increase the pressure on PAs with no other significant source of timber to meet the growing domestic and regional demand. Plantations offer an opportunity to offset this risk to PAs.

Examples of high-value timber plantations exist in Cambodia. Two companies are operating plantations in and around the Phnom Aural Wildlife Sanctuary in the CML: Grandis Timber, the only company certified by the Forest Stewardship Council (FSC) in Cambodia; and Cambodia Teak, a Public-Private Partnership (PPP) collaboration between the MoE and a private company. This collaboration is being piloted in Tasal CPA (Figure 13).

The Cambodia Teak production model has a relatively short harvest cycle but high inputs and capital requirements. Cambodia Teak aims to have a 7-year harvest, as opposed to the 15-25-year harvests in conventional plantations. The company is using irrigation systems and fertilizer to achieve growth throughout the year. Such irrigation is possible due to the Tasal CPA being located close to the Stung Tasal dam, an Indian-funded dam aiming to provide irrigation capacity for 10,000 ha in the Aural District. Aside from questions around the sustainability of the production model in the context of climate change, the capital-intensive nature of the model is likely difficult to be widely replicated. Nevertheless, this model has piloted an interesting benefit-sharing mechanism that could serve as a model for similar forms of private-sector partnerships.

The FSC certification of the Grandis Timber production model requires social, economic, and conservation outcomes. As part of the FSC requirements, Grandis Timber is required to engage with local communities and contribute to their social and economic development.[81] The company supported the mapping and legal recognition of community land around the concession and allowed cattle grazing while improving local road

78 *Global Forest Resources Assessment 2020* (FAO, 2020), https://doi.org/10.4060/ca8753en.

79 Carolina Y. Shimamoto et al., "Restoration of Ecosystem Services in Tropical Forests: A Global Meta-Analysis," *PLOS ONE* 13, no. 12 (déc 2018): e0208523, https://doi.org/10.1371/journal.pone.0208523.

80 Delux Chhun, "Drivers of Forest Change in the Greater Mekong Subregion: Cambodia Country Report" (USAID Lowering Emissions in Asia's Forests, September 2015).

81 FSC, "Interim National Standard for The Kingdom of Cambodia - v1.0," 2020.

Figure 13. Intensive teak plantation by private company in Tasal CPA, Phnom Aural Wildlife Sanctuary.

Photo: *H.E. Khieu Borin, Director of Community Livelihoods Department at the Ministry of Environment*

infrastructures. FSC also requires the company to allocate a minimum of 10% of the management unit to conservation, but Grandis Timber has gone beyond this, with 2,256 ha of conservation area managed in close collaboration with Conservation International, Wildlife Alliance, and the Forestry Administration. The company has also been providing thinning residues to local charcoal production centers in a nearby Community Forest, contributing to the reduction of illegal sources for fuelwood.

The outgrower approach has potential, but it is limited by the capital requirements and long crop rotation of high-value timber plantations. The capital-intensive nature of the model piloted in Tasal CPA will mean it is unlikely to be adopted by local farmers. The promotion of an outgrowers scheme (also referred to as contract farming[82]) in collaboration with Grandis Timber has more potential. But in a frontier landscape like the CML where more immediate returns are expected, the timeframe for high-value timber rotation (around 20 years for conventional teak) could be perceived as unmanageably long, unless other financial incentives are provided upfront to communities.

82 *In this report we use contract farming and outgrowing interchangeably. These terms refer to long-term supply agreements between farmers and agribusiness processing/marketing companies/buyers that bring mutual gains and normally include price and supply arrangements (date, quantity, and quality). Contractual arrangements may be verbal or written and vary widely, depending on the countries, crops and companies concerned. Schemes usually entail a range of activities (services) that secure access to produce – as in-kind input supply or on credit – extension services, transport for produce, and credit guarantees. Lisa Paglietti and Roble Sabrie. Outgrower schemes: advantages of different business models for sustainable crop intensification - Ghana case studies. FAO Investment Centre. Learning from Investment Practices. 2012*

SHORT-ROTATION PLANTATIONS HAVE FASTER RETURNS ON INVESTMENT BUT HIGH ENVIRONMENTAL COSTS RELATIVE TO THE INCOME THEY GENERATE

The focus in the region is changing towards fast-growing species like acacia and eucalyptus. While historically, most planted forests in the region were for high-value timber production, the demand for sawn wood, plywood, particleboard, pulp and paper, cardboard, and sustainable biomass energy is increasing rapidly. The demand for wood fiber is also steadily increasing in the quest for replacing plastic fibers. More efficient wood processing technologies enable the processing of lower-diameter logs for furniture or structural wood elements.[83] For example, the demand for paper and paperboard in the Asia-Pacific has risen from 102 million tonnes (t) in 2000 to 196 million t in 2017, fueled by e-commerce development. The market is likely to continue growing following the growth of e-commerce, the global trend to move away from plastic, and the development of biomass pellets as a source of renewable energy.

A few large-scale companies are dominating the short-rotation timber sector, and smallholder plantations are not common. This is a result of industrial-scale plantations of several thousand hectares of acacia and eucalyptus, commonly developed as part of the ELC mechanism (Figure 14). Following the moratorium on ELC, the use of state land for large plantations continued in the form of PPPs between the private sector and the Forestry Administration.[84]

Vietnam and Thailand have developed strong policies to support tree planting by smallholders in areas where agriculture is uneconomic. It is estimated that 70% of Thailand's eucalyptus supply is produced through contractual arrangements between companies and farmers. In most cases, companies provide financial and technical support to farmers, including access to high-quality planting material. This model benefits companies with reduced operational costs and risks related to land tenure while providing significant income for landholders in degraded areas. Lao PDR has also attracted a number of large-scale investors for the production of pulp for the textile industry. Companies have expressed interest in approaching Cambodia if regulatory conditions are favorable.

Figure 14. Acacia plantation in CamAgra plantation, Kampong Seila, Koh Kong Province.

Photo: *Yann François*

There is good potential to include planted forests in highly degraded parts of CPAs to contribute to local income generation and PA financing. Such an initiative should promote outgrowers schemes, building on the lessons learned from successful policies in Vietnam and Thailand. Such short-rotation plantations will be more attractive to CPA members than high-value timber plantations are, given their ability to generate revenues in a shorter timeframe and reduce performance risk. The primary constraint on this approach is that in order to be profitable, companies require a network of CPA plots of at least 200 ha per CPA. Finding such places in the CML will require more detailed mapping of the CPA degradation status than that which is currently available.

83 Food and Agriculture Organization of the United Nations, *Forest Futures Sustainable Pathways for Forests, Landscapes and People in the Asia-Pacific Region*, 2019.

84 Under the sub-decree on Rules for Granting User Rights to Plant Trees within State Forest Lands, the Forestry Administration is allowed to engage in Public Private Partnership for tree plantation on public lands.

Short-rotation plantations tend to have higher biodiversity impacts than other forms of forest management for a given economic return. A meta-analysis of 287 published studies of biodiversity-economic tradeoffs between various forest management approaches found that fuelwood plantations resulted in the greatest impact on the richness of local species. Furthermore, the fraction of species lost per US$1 million in profits for Acacia biomass plantations was three times that of plantations for teak logs and ten times greater than that of conventional selective logging of various species[85].

Monocultures are particularly vulnerable to climate change due to the inherent lack of resilience to pests, diseases, and climate hazards. Plantation monocultures are more at risk for catastrophic losses from species-specific pests and diseases and severe weather events compared to mixed-species plantations. To increase climate resilience and reduce risks from pests and diseases, developing mixed-species plantations or a fine-scale mosaic with a variety of single-species stands is recommended.[86]

The objective of private sector partnerships in PAs should be to ensure that any loss of biodiversity brings the maximum economic return to the widest variety of people. Different strategies can be implemented to achieve this objective, from maximizing land-use through intercropping with agricultural crops, to displacing forest degradation by using forest residues for charcoal production, to maintaining some conservation areas among concessions.

4.2. INTERCROPPING INCREASES OPPORTUNITIES FOR LOCAL COMMUNITIES

Short-rotation tree plantation with intercropping of agricultural crops has the potential to significantly increase benefits for the local population. Increased benefits from this approach are derived from allowing farmers to grow crops and raise cattle within the plantation, thus increasing the overall economic potential of the model.

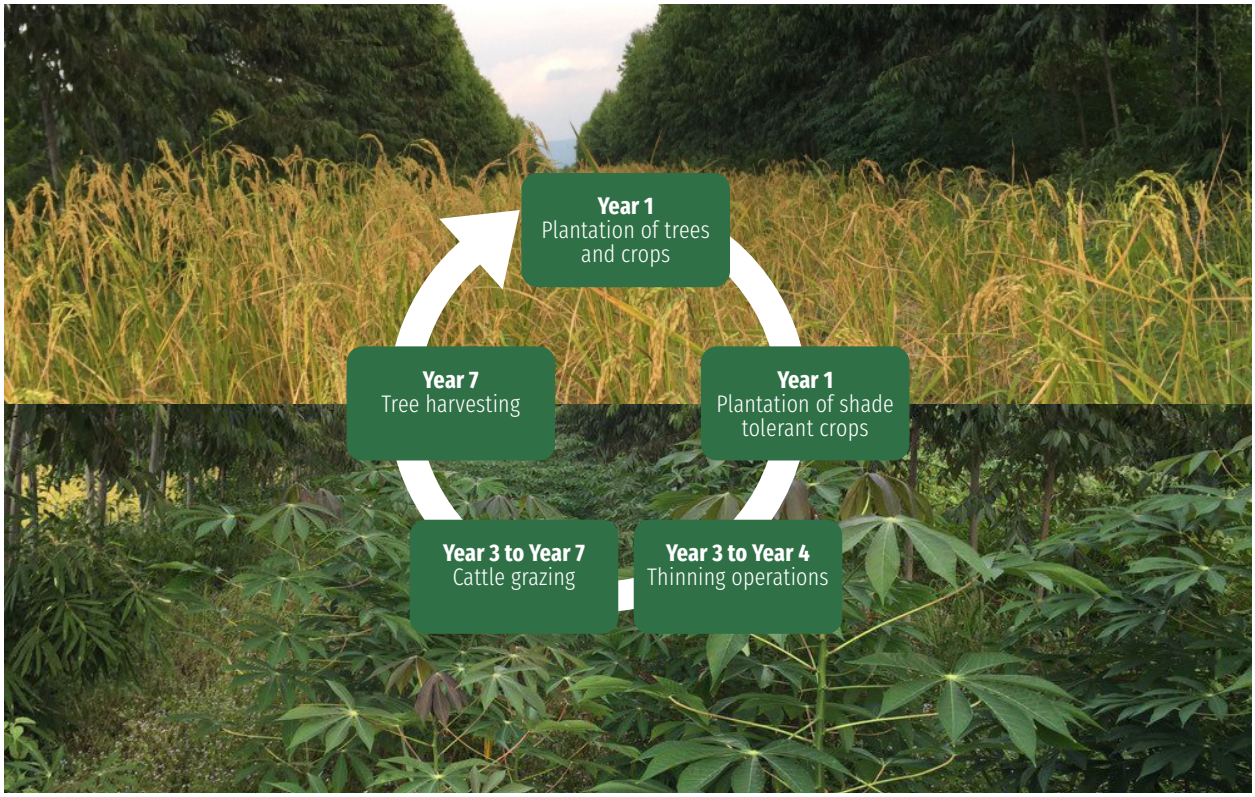
Large-scale commercial approaches to agroforestry are being implemented in the region. The agroforestry models implemented in Lao PDR provide an interesting case study of multiple-use plantations (Figure 15).[87] Several variations of the model exist, but the most common one is a 9m by 1m spacing of eucalyptus trees, instead of the conventional 3m by 3m spacing. This extra spacing allows farmers to grow rice, then shade-tolerant crops, and finally, grass for livestock grazing as the canopy cover grows. The development of this model has led to new collaborations between the private sector and communities to promote silvo-pastoral systems, bringing benefits to both the company (lower weeding costs) and the farmer. In Cambodia, most plantation companies choose acacia over eucalyptus, as acacia produces more shade than eucalyptus does and has a more positive impact on soil fertility. Given this, it would be very worthwhile to pilot this model in collaboration with the private sector to assess its applicability for CPAs.

85 Abhishek Chaudhary et al., "Impact of Forest Management on Species Richness: Global Meta-Analysis and Economic Trade-Offs," *Scientific Reports* 6, no. 1 (April 4, 2016): 1–10, https://doi.org/10.1038/srep23954.

86 Michael Padmanaba and R. Corlett, "Minimizing Risks of Invasive Alien Plant Species in Tropical Production Forest Management," *Forests 5* (August 15, 2014): 1982–98, https://doi.org/10.3390/f5081982.

87 Implemented by the Swedish companies Burapha Agroforestry Company (BAFCO) and Stora Enso Laos Stora Enso has since decided to downsize its operations in Laos: https://www.storaenso.com/en/sustainability/latest-

Figure 15. The intercropping cycle (inert) and examples of intercropping rice (top) and cassava (bottom).



Cycle adapted from Burapha Agroforestry and images from New Generation Plantation/Stora Enso Agroforestry, Lao PDR.

Agroforestry outperformed plantation monocultures among model approaches trialed in Laos. Analysis shows that the agroforestry model described above outperforms monocultures for both the company and local farmers, with a higher net present value and internal rate of return than that of eucalyptus monoculture[88] (Figure 16).

The main barrier to the expansion of intercropping is the market's security for the second crop and the need for technical assistance. A survey of stakeholders involved in the perennial crop sector in the region highlighted these barriers.[89] Beyond technical support, partnerships with private companies are needed to secure and develop the market of the second crop.

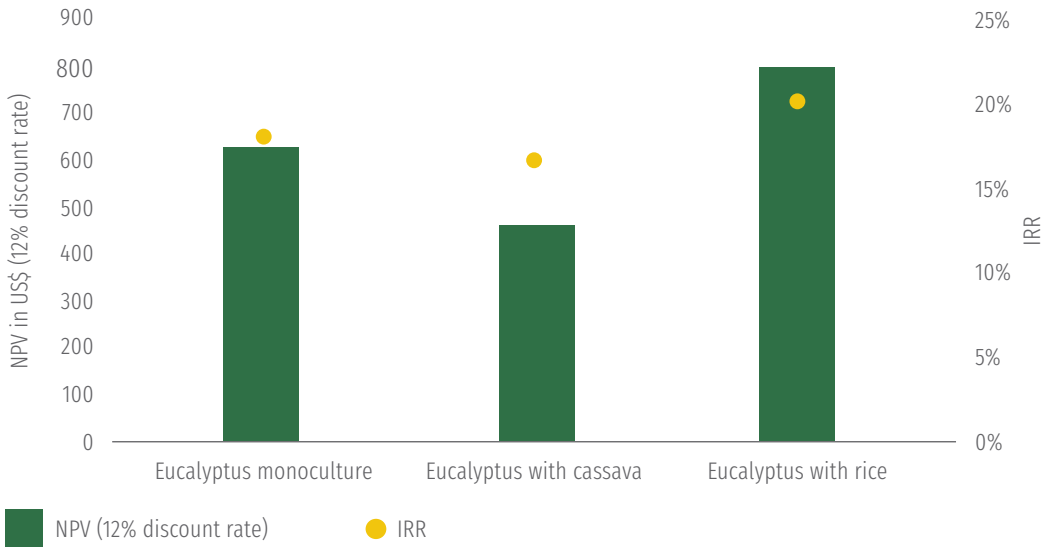
Vacant, degraded, marginal, or under-utilized land in CPAs is required for tree plantations. Such areas are required to attract investment in plantations or agroforestry that would create employment in the area and contribute to displacing pressure from natural forests.

The development of private sector partnerships for establishing medium-scale plantations will be limited by companies wanting to develop plantations close to their existing concessions. Phnom Aural Wildlife Sanctuary appears to be the most interesting location in the CML due to its proximity to two leading plantation companies: the Grandis Timber and CamAgra, with the latter already having an ongoing collaboration with the MoE.

88 Somvang Phimmavong et al., "Financial Returns from Collaborative Investment Models of Eucalyptus Agroforestry Plantations in Lao PDR," *Land Use Policy* 87 (September 1, 2019): 104060, https://doi.org/10.1016/j.landusepol.2019.104060.

89 Challenges and Opportunities for Intercropping in Southeast Asia - Summary of EIU Findings" (USAID Green Invest Asia, August 2020).

Figure 16. Economic performance of short-rotation tree plantation with intercropping in Laos PDR.



Data: *Phimmavong et al., 2019.*

4.3. SWITCH TO SUSTAINABLE CHARCOAL USING PLANTATION RESIDUES

Most plantation models generate residues that can be used as biomass energy. Residues in plantations originate from thinning, harvesting, and processing. More than half of the biomass produced can be used for energy production for plantations aiming to produce veneers.

Despite substantial growth in clean energy access in urban areas, the charcoal sector remains an important driver of forest degradation in Cambodia. More than 400,000 t of charcoal is consumed every year in the domestic market, representing more than 3 million t of wood harvested per year[90]. The Aural Wildlife Sanctuary has been the historical supply area for charcoal for Phnom Penh, with more than 130,000 t produced every year,[91] representing a third of the national production (Figure 18). While in other parts of the country, charcoal is mostly a by-product of land-use change, in the Aural Wildlife Sanctuary, as well as in other parts of the CML, it remains a driver of forest degradation.

More than 80,000 farmers are estimated to be involved in producing charcoal.[92] This figure is likely an underestimate, as it excludes all the producers who are not engaged in agricultural production. Research conducted by Kampong Speu Province in the northwest of the CML showed that firewood and charcoal revenues exceeded the combined revenues from timber and NTFP collection.[93]

90 Dr. Moeko Saito Jensen and Dr. Richard Colin Marshall, "Human Development Report 2019: Sustaining Natural Resources for All" (Phnom Penh, Cambodia: UNDP, 2019).

91 Yann François, Vannareth Huoy, and Romain Joya, "Charcoal, Forests and Livelihoods in the Northern Cardamoms, Cambodia" (Phnom Penh, Cambodia: Geres, February 2015).

92 National Institute of Statistics and Ministry of Agriculture, Forestry and Fisheries, "Agricultural Census 2013" (Phnom Penh, Cambodia: Ministry of Planning, December 2015).

93 "Valuation of Ecosystem Services in the Prek Tnoat Watershed (2nd Draft)" (UNDP: Phnom Penh, 2018).

Figure 17. Acacia Mangium thinning residues from Grandis Timber in Kampong Speu could be used for charcoal.

Photo: *Eugene Kraamwinkel*

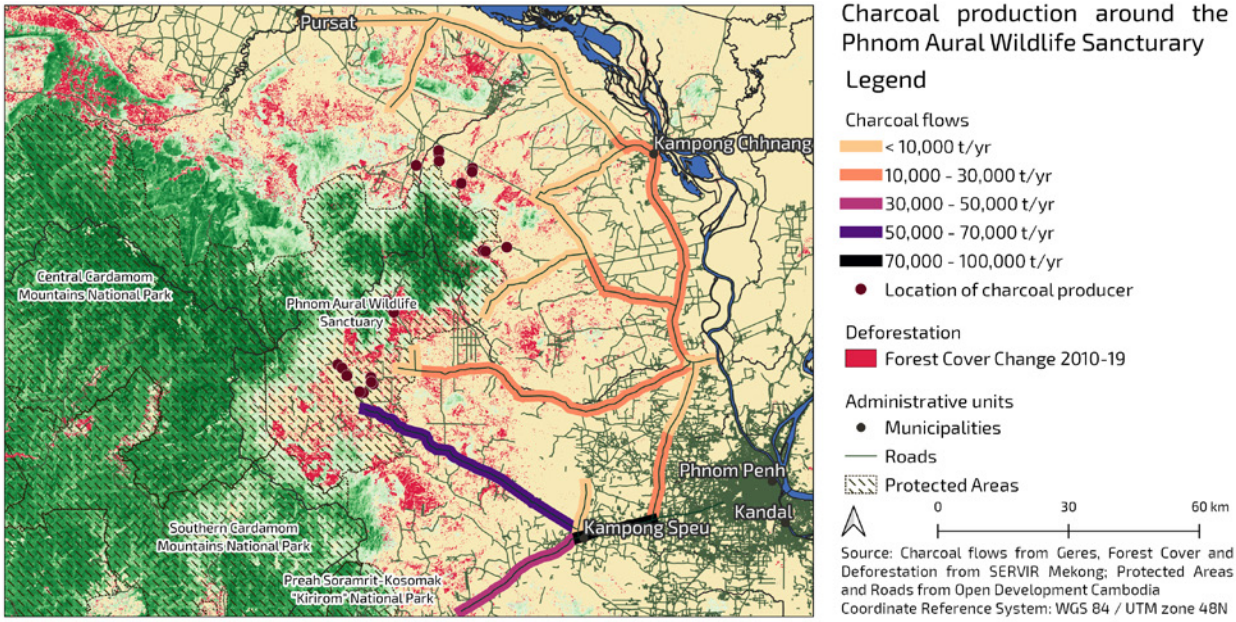
Despite the scale of the charcoal sector, it remains informal with few private initiatives. These few private sector initiatives include Grandis Timber, which has piloted an approach with a nearby Community Forest using thinning residues from its plantation for sustainable charcoal (Figure 17). Khmer Green Charcoal has expanded its current char-briquette business to include sustainable charcoal sourced from Community Forestry and commercial plantations residues.

Establishing plantations in degraded CPAs and encouraging charcoal producers to transition to sustainable production using residues has great potential. This approach would be particularly appropriate in the Phnom Aural Wildlife Sanctuary, a major center for charcoal production leading to direct forest degradation of the PA. For this approach to be successful, an increase in law enforcement for a currently unregulated sector with very low levels of formal or informal taxation is necessary. With the formalization of the sector, investments in high-efficiency charcoal technologies can lead to major wood savings. Large-scale industrial technologies can double conversion efficiency while reducing the processing time from 2 weeks to 2 days.

The development of plantations is likely to be viable in a wide range of areas, but co-benefits may vary from place to place. The development of a plantation model in which residues are sold to charcoal producers would have the highest co-benefits for PA management in locations such as Phnom Aural, where there have historically been high incidences of illegal harvesting of timber and charcoal.

Many CPAs are in heavily degraded areas and could represent interesting locations for commercial tree plantations. One confounding factor for such developments is the high rates of land cover change happening in many CPAs (Figure 19). Therefore, field assessments and consultations with local stakeholders are essential to identify real potential, maximize co-benefits, and ensure that the plantations do not negatively impact vulnerable populations.

Figure 18. Flow of charcoal and location of producers in Phnom Aural Wildlife Sanctuary.



4.4. AGARWOOD IS A HIGH-VALUE PRODUCT WITH A STRONG CAMBODIA BRAND

Agarwood is a highly-priced incense that has been widely used in the Middle East, China, and Japan for more than 3000 years.[94] Agarwood has been a signature product of Cambodia for centuries, with Southeast Asia being the historical center of supply. It is a fragrant, resinous wood used in incense, perfume, and small carvings. Agarwood forms through the wounding of Aquilaria trees. The wound can originate from lightning strikes, broken branches, animal grazing, pests and diseases, and the infection of the heartwood with a specific mold (*Phialophora parasitica*).

The high demand for agarwood led to the depletion of wild resources and has caused it to be classified as Critically Endangered[95]**.** Agarwood is among the most expensive incense in the world, costing up to US$30,000 per kg for its essential oil. It has been overharvested in Cambodia and throughout its range. This scarcity has resulted in a ban on the trade of agarwood harvested in the wild. Convention of International Trade of Endangered Species (CITES)[96] permits are required for the trade of cultivated agarwood.[97] The increase in demand, decrease in supply, and high prices are increasingly attracting investors, mainly from China, who see agarwood as a high-value asset[98] and fund large-scale plantations.

94 Arlene López-Sampson and Tony Page, "History of Use and Trade of Agarwood," *Economic Botany* 72, no. 1 (March 1, 2018): 107–29, https://doi.org/10.1007/s12231-018-9408-4.

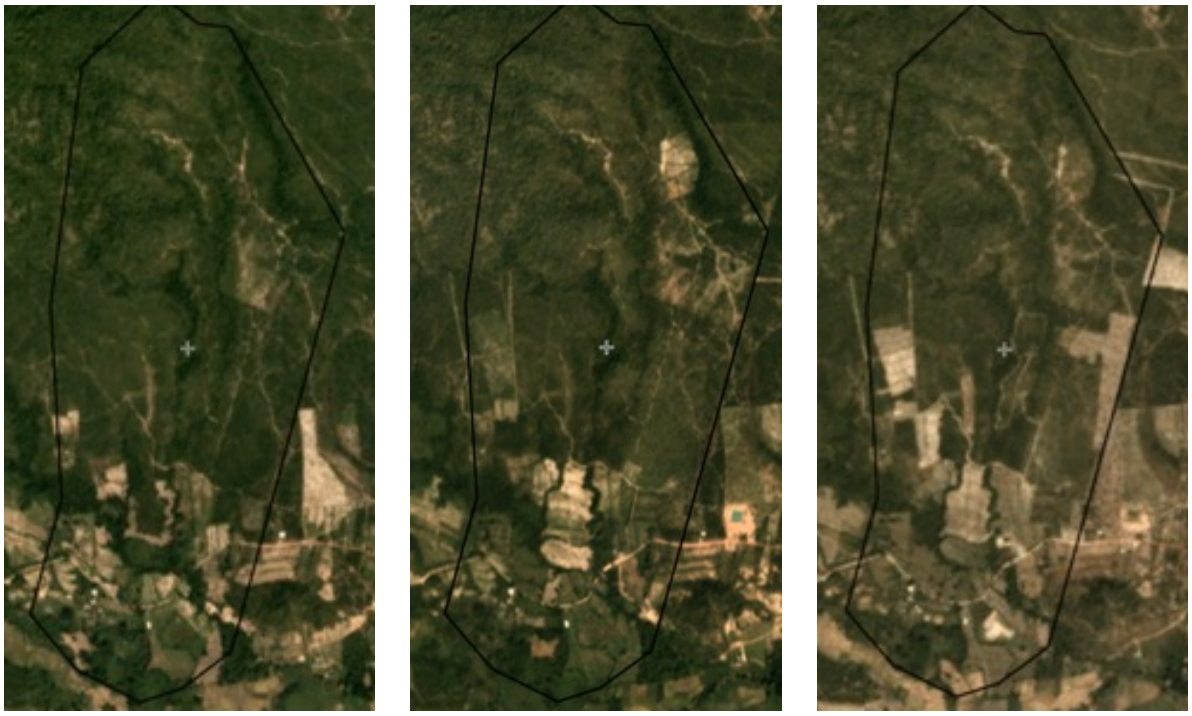
95 Cheng Seng Tan et al., "Agarwood Induction: Current Developments and Future Perspectives," *Frontiers in Plant Science* 10 (February 7, 2019), https://doi.org/10.3389/fpls.2019.00122.

96 Convention on International Trade in Endangered Species of Wild Fauna and Flora. https://cites.org/en

97 under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

98 Al Jazeera, *Scent from Heaven - On the Trail of Oud*, accessed July 8, 2020, https://interactive.aljazeera.com/aje/2016/oud-agarwood-scent-from-heaven/index.html.

Figure 19. An example of the land cover change in CPAs that is widespread in the landscape. Cheng Leng CPA, Phnom Aural Wildlife Sanctuary.



2017 2018 2019

Photo: *Eugene Kraamwinkel*

Cambodian agarwood is considered high quality and is highly sought after. The perception of the quality of Cambodian agarwood originated in the mid-1990s when Cambodia was a major supplier of agarwood, mostly sourced from the CML. Although largely extirpated from the wild, agarwood still occurs in the CML in smallholder plots from 20 to 20,000 aquilaria trees, mostly in Chi Phat and Tatai Leu in the Koh Kong Province. Large-scale plantations have been developed in recent times. Different processes using mechanical components, chemicals, insects, or pathogens have been developed to mimic the formation of agarwood. It is estimated that agarwood can be produced after 6-7 years in Koh Kong Province. Although the country of origin is important in the price and desirability of agarwood, the place of origin is now more a brand name than the actual country of origin, and provenance is hard to establish.[99] Because Cambodian agarwood remains highly in demand, leading Thai and Vietnamese sellers are apparently marketing their products as Cambodian Agarwood.

The total value of the agarwood market is unknown but is likely around US$6-8 billion annually. Cambodia reported only 23 kg of agarwood exports between 2013-2017, indicating that most trade from the country is undeclared.[100] This is supported by reports of agarwood oil being transported in personal luggage, by plane, to Singapore before being sold on the black market to buyers from the Middle East.[101]

99 Marina Antonopoulou et al., "The Trade and Use of Agarwood in the United Arab Emirates" (Cambridge, UK: TRAFFIC, October 2010).

100 "CITES Trade Database," accessed July 8, 2020, https://trade.cites.org/.

101 Marina Antonopoulou et al., "The Trade and Use of Agarwood in the United Arab Emirates" (Cambridge, UK: TRAFFIC, October 2010).

Box 4. Producing Agarwood by inoculating trees

A partnership between Conservation International, private-sector partner Krassna Cambodi, and communities in Tatai Leu piloted Agarwood inoculation on private home-gardens in the Central Cardamoms National Park.

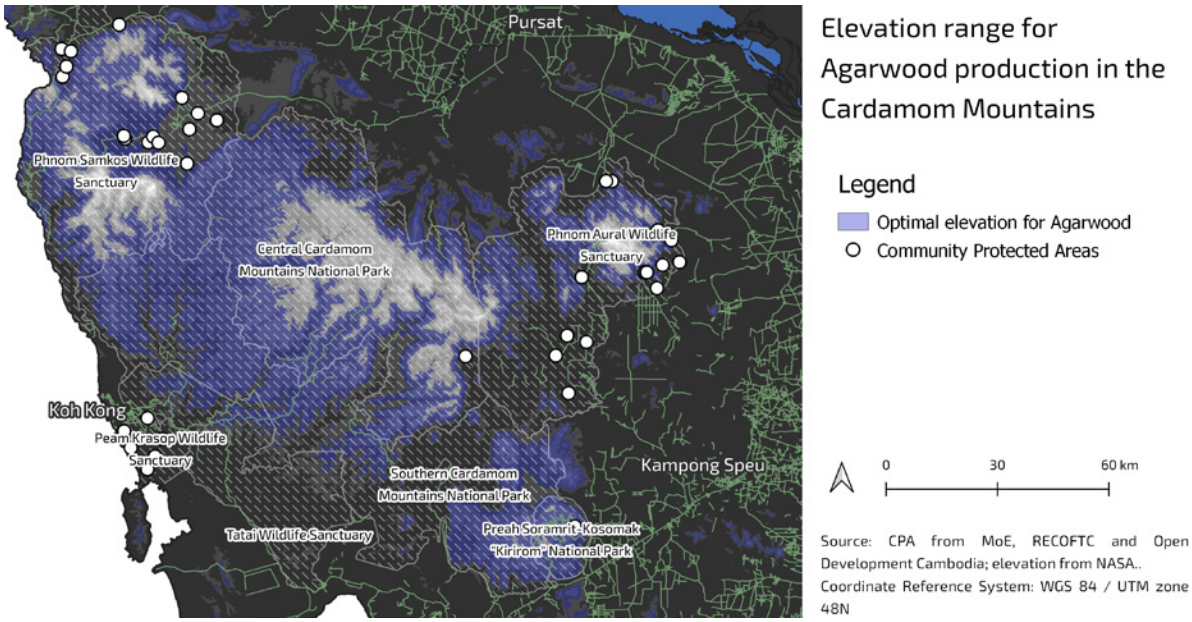
Aquilaria trees are inoculated using a process patented by the University of Minnesota. This method of producing Agarwood involves forming an artificial wound – by drilling a hole – in the xylem of a 4–5-year-old tree with a pipe then placed in the wound to aerate it. A resin-inducing agent such as a fungus is introduced into the wound that stimulates resin production in the tree. Cultures of fungi are isolated from fresh agarwood obtained from natural forests are then also introduced into the wound.

The pilot projected ended with positive technical results — buyers were pleased with the quality of the Agarwood — but there is insufficient financial incentive for the farmers to develop this further; the current buying price per tree remains relatively low with a maximum of US$50 per tree after 10 years.

A next step being considered is for farmers to form an association and develop an outgrower relationship with one of the large Agarwood plantations in the Koh Kong Province. For this to be viable, a revenue-share on oil sales for the farmers would be needed to increase their returns.

The process of inoculating Aquilaria trees to produce Agarwood (left) and the resultant infected heartwood (right) from a project in the Central Cardamoms National Park.
Photo: Krassna Cambodi

Figure 20. Potential agarwood plantation areas based on elevation (blue)



Several local companies are engaged in the agarwood sector but have limited processing, technologies, and ability to engage with international buyers. One such pilot project, a partnership between communities in Tatai Leu, Conservation International, and private sector partner Krassna Cambodi, is inoculating aquilaria trees using a patented process.[102] Although at the pilot stage the quality of the agarwood has been promising, financial returns have not been as promising (Box 4).

Most agarwood is sold without a CITES license due to the administrative costs of obtaining the licenses. While such a license would provide a premium for sellers and guarantee the agarwood's legality, many actors in the supply chain do not believe that the administrative burden of obtaining a permit is worth the effort. Fulfilling the need for CITES permits requires engagement with three different ministries. The Forestry Administration regulates the trade, but agreements from the MoE and Ministry of Commerce are required to remove the agarwood from the PA and export it legally. Being able to streamline the process of obtaining CITES permits appears to be essential for developing the sector.

Agarwood fits well into the premium products strategy. Given agarwood from Cambodia is considered a premium product appreciated by buyers, there is potential to develop the sector in a certified and sustainable way. Working with existing actors in the value chain to develop the sector in a sustainable way represents an interesting opportunity for the CML. In the short and medium terms, these activities will likely need to be subsidized to support the engagement of smallholder farmers developing their holdings.

Agarwood production could be integrated with other added-value crops in a forest farming model. Such a model could build on the existing essential oil production unit in Tatai Leu (Box 12). This would be a long-term project that goes beyond what most farmers expect in terms of time for a return on investment, and it requires a significant long-term commitment from private and public stakeholders.

102 Robert Blanchette and Henry Beek, Cultivated Agarwood, United States US20050008657A1, filed August 5, 2004, and issued January 13, 2005, https://patents.google.com/patent/US20050008657A1/en.

Agarwood can grow across a large area in the CML. Although the altitudinal range of agarwood is well suited to the CML (Figure 20), this activity would likely be concentrated in Ou Saom and Tatai Leu in the Koh Kong Province, where there is an existing industry. CPAs have yet to be established at these sites.

4.5. AGROFORESTRY AND CONSERVATION-FRIENDLY AGRICULTURE

Contract farming is a major tool used to achieve economic development and poverty reduction in the agricultural sector. Various models of contract farming have been widely applied in the rice sector. In general, these models involve long-term supply agreements between farmers and the private sector for mutual gains, including premium prices, extension services or credit guarantees for the farmer and for the company, and a guaranteed supply of commodities that may have added value for marketing or premium sales.[103] Examples of such models exist in Cambodia in the rice sector, such as Ibis Rice and Amru Rice, the tobacco sector, and at a smaller scale, the agricultural sector for fruits and vegetables.

CONSERVATION-FRIENDLY RICE PRODUCTION HAS BENEFITED FARMERS AND WILDLIFE

The Ibis Rice Conservation Company partners with farmers and PA authorities to produce and market high-quality, certified-organic jasmine rice. In exchange for a premium price, the farmer commits to conservation-friendly practices, including refraining from hunting and illegal land clearing in PAs (Box 5). Farmers are only permitted to clear agreed areas identified in a land-use plan within the Community Zone. The Ibis Rice model can only operate in an area where there is already a PA monitoring system in place. The process used is complex and involves a wide range of actors, including local committees, local law enforcement, NGOs, and the Ibis Rice Conservation Company (Figure 21). Each of these actors has its own responsibility in ensuring that the conservation monitoring system is working.

The Ibis Rice model is expensive and requires substantial support that cannot be covered by the private sector alone. Models like Ibis Rice remain reliant on public funding, which indirectly covers the value of these positive externalities.

Currently, aromatic rice is mostly produced outside PAs in the CML in the Pursat, Kampong Speu, and Battambang Provinces, so the potential of applying the Ibis Rice model in the landscape will need further assessments.

The multi-stakeholder collaboration used in the Ibis Rice model could be applied to other crops. The Ibis Rice model uses an interesting leverage effect for achieving sustainable landscape management in PAs by mobilizing private sector financial resources and increasing local income generation for smallholder farmers. In the absence of an NGO partner to subsidize the costs, this model might be best applied to the export of permanent crops to international markets, which is a main driver of deforestation in many PAs.

103 *Lisa Paglietti and Roble Sabrie. Outgrower schemes: advantages of different business models for sustainable crop intensification - Ghana case studies. FAO Investment Centre. Learning from Investment Practices. 2012*

Box 5. Wildlife Friendly™ organic rice that has conservation and livelihood benefits

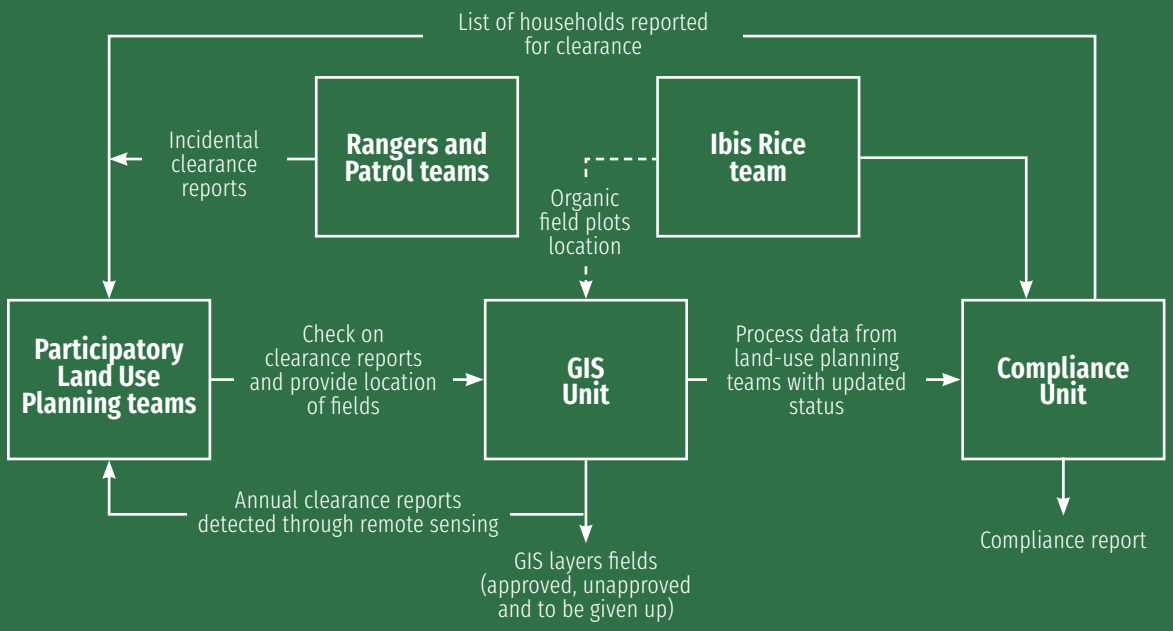
Ibis Rice is a conservation-enterprise developed by NGOs — the Wildlife Conservation Society and Sansom Mlup Prey Cambodia — now run by the stand-alone Ibis Rice Conservation Company. The project aims at partnering with farmers and supporting them in the production of high-quality, organic jasmine rice. The farmers' production would be then purchased by Ibis Rice at a higher price than current production, under the condition that farmers commit to conservation-friendly practices, including no-hunting and no-land clearing in PA.

Ibis Rice is certified Wildlife FriendlyTM and organic in the US (USDA) and EU (EU Organic Regulation) markets as well as EcoCert certified in other countries. Around 80% of Ibis Rice incomes come from exports, mostly to Germany, Canada, and the USA. The high quality is achieved through careful selection of high purity foundation seeds and regular monitoring of farmers to replenish seed stocks ensuring they have enough seeds for the season. This regular monitoring allows Ibis Rice to ensure a good consistency in the production from the foundation seeds to the post-harvest management.

The Ibis Rice model can operate successfully with PAs. The success of this model, particularly in ensuring there is no illegal land grabbing or land-use change, requires secure land tenure (with all fields mapped), completed PA zonation, and a close relationship with PA authorities to ensure compliance to PA rules. The model explicitly acknowledges that households and villages grow and require more land, but farmers can only clear agreed areas identified in a land-use plan within the Sustainable Use Zone. The Compliance to Wildlife FriendlyTM and organic rules is the responsibility of local committees, NGO partners, and the Ibis Rice Conservation Company.

Wildlife Friendly™ certification does not create a market or bring a significant price premium. The sales of Ibis Rice to premium markets rely on high quality, consistency, and organic certification. Therefore, while the Ibis Rice model can be seen as a Payment for Ecosystem Services model, it is closer to a hybrid model where buyers and producers are buying for the quality of the rice rather than the environmental service, but the condition of farmers' premium payments is based on environmental services. Ibis Rice can be seen as a way to, on the one hand, improve farmers' income and raise their production quality and, on the other hand, provide additional incentives for the respect of the PA management plan and regulations, as these benefits are conditional to the compliance with these regulations.

Figure 21 . Ibis Rice compliance monitoring system. Re-designed from Travers (2018)



ORGANIC AND GOOD AGRICULTURAL PRACTICES (GAP) VEGETABLES ARE IN HIGH DEMAND

There has been a rapid growth in demand for high-quality and safely produced vegetables in Cambodia. This growth has been driven by a growing middle-class and increasingly health-conscious consumers in Cambodia, a growing tourism sector and government, and consumers' willingness to reduce imports of vegetables from Vietnam, Thailand, and China. Despite the increase in domestic production, imports still represented 32% of the vegetable consumption in Cambodia at the end of 2019.[104] CamGAP is a major initiative to improve food safety and increase the competitiveness of Cambodian farmers (Box 6).

A wide range of actors is involved in vegetable cultivation. These include large-scale, professionally managed farms, farmers' cooperatives, businesses engaged in contract farming, and individual smallholders.

The vegetable market is increasingly split into the premium and local market segments. The premium segment is for GAP, and organic vegetables have higher-priced products targeted at supermarkets, hotels, and restaurants in major urban centers and tourist areas. The local wet market segment generally offers lower prices and suffers from significant fluctuations in prices due to its vulnerability to large-scale exports by foreign countries.

104 "Boosting Domestic Vegetable Production to Curb Imports," Khmer Times, January 2, 2020, https://www.khmertimeskh.com/676080/boosting-domestic-vegetable-production-to-curb-imports/.

Box 6. Cambodian Good Agricultural Practices (CamGAP)

Food safety standards in Cambodia have not always been considered mandatory. Recently, stakeholders in the agriculture sector in Cambodia recognized that in order to compete with other countries in marketing agricultural products and to improve food safety, GAP need to be better incorporated into all farming activities.

CamGAP was developed to increase demand for reliable, high-quality inputs, increase the value of farms, and to develop the skills of farmers. CamGAP has national certification and accreditation systems and draws upon concepts in the ASEAN GAP that itself was based on international regulatory frameworks.

A CamGAP certified market garden in Cambodia
Photo: Project Alba

(Development of standards & scheme for GAP implementation & certification based on ASEAN GAP. FAO 2019)

Most businesses see the premium vegetable market as the only way to reach profitability. This view was expressed by businesses interviewed for this report in both the contract farming and managed farming models. The premium market has strict requirements for the reliability of the supply, quality, and safety of products, focusing on parasite control for fresh vegetables. In return, the premium market provides high profits. There is an increasing number of companies focusing on the premium vegetable market, including in the CML, where increasing investments in ecotourism also open up high-end local market demand for vegetables.

Working with smallholders in the premium vegetable market involves high logistic costs. Many smallholders only have a few hundred linear meters of vegetables, and their level of professionalism is generally low. Few farmers see farming as a business that they are willing to invest in, which leads to high costs for the businesses involved to ensure that premium requirements are being met by partner farmers.

Gathering farmers into cooperatives is seen as essential to support them in accessing premium markets. Companies supplying major supermarkets and restaurants require a robust supply chain to ensure orders are on time and of sufficient quality and quantity if they are to retain such customers. Cooperatives offer an opportunity not only to secure a sufficient supply of produce, but also to build the professional capacities of farmers.

The COVID-19 crisis may result in a consolidation of the sector. Many actors in the horticultural sector have faced severe economic stress due to a drop in demand from the hotels and restaurants linked to tourism. The development of online grocery platforms has created a small, but growing, niche market for some actors, partly compensating for other decreases in sales.

Despite the challenges, there is great potential to develop contract farming for high-quality GAP or organic vegetables to supply ecotourism sites. Wholesalers, retailers and restaurants, and hotels report difficulties in locally sourcing high-quality, safe vegetables. This provides an opportunity for the CSLEP project to strengthen this value chain with technical assistance and infrastructure, such as greenhouses and cold storage. Potential partners exist in the CML (Box 7) that would be suitable as private sector partners.

AGROFORESTRY WITH PERMANENT CROPS CAN OFFSET BIODIVERSITY LOSSES FROM PLANTATIONS

Permanent crops are an increasing source of income for farmers but also a potential driver of land-use change in PAs. Plantations of permanent crops such as durian, banana, mango, and mangosteen crops are rapidly expanding in many parts of the CML. These plantations result in land-use change and biodiversity loss in PAs, but they also provide an increasing source of revenue for the farmers and a source of daily wages for landless laborers.

It is difficult to develop conservation-friendly livelihoods when competing against highly profitable permanent crops. Given the profitability of these crops and the ability to generate revenues quickly and regularly, they are very appealing to rural farmers. With high rates of migration and the establishment of large-scale farms by external investors, the pressure from perennial crops is likely to continue to increase. Therefore, it is crucial to develop alternative agroforestry models that provide good income generation and biodiversity benefits.

It is possible to develop agroforestry models that maintain biodiversity while contributing to economic development. While plantations of fruit trees contain significantly less biodiversity than natural forests, maintaining native species in plantations and/or combining different fruit trees and timber species can have significant positive effects on biodiversity. A global meta-analysis has shown that the promotion of agroforestry using native species can have an impact similar to that of restoration activities. However, such activities will undeniably lead to some opportunity costs for farmers that need to be covered, at least in the beginning. It is crucial to explore potential incentive mechanisms for farmers to maintain some biodiversity in these plantations through some form of payment for ecosystem services (PES).

For export-oriented products, certification and Payment for Ecosystem Services schemes can provide the necessary price premium and incentives to encourage the adoption of more sustainable practices. For example, Rainforest Alliance certifies mango, banana, citrus, and pineapple under strict no-deforestation requirements. Farms are required to keep all remanent trees and ensure that the quality and quantity of native trees are stable. A minimum of 10% of native tree canopy cover (15% for shade-tolerant species) is required. The standard also requires owners and workers to refrain from hunting, except for small farmers who are allowed to hunt non-threatened species non-commercially. Also, farm owners are required to provide fair profit sharing as well as good working conditions.[105] To provide the necessary incentives, different types of certification schemes can be combined to provide farmers with the necessary payment for Ecosystem Services. These certification schemes include Forest Stewardship Council (FSC), EcoCert Organic certification, Wildlife Friendly certification, and carbon finance, such as Gold Standard or Verified Carbon Standard (VCS).

105 Rainforest Alliance, "Rainforest Alliance Sustainable Agriculture Standard," June 2020.

Box 7. Companies helping develop a reliable domestic market for vegetables.

Eco-Agri Co., Ltd. (EAC) and its sister companies Picnic and Khmer Organic have implemented several projects in the CML. EAC has an eco-resort called Picnic in the Kampong Seila District. EAC has been working with a large number of development partners on projects providing technical training as well as high-quality inputs to farmers and, in some cases, supporting market linkages.

Innovative Agro Technology (IAT) manufactures greenhouses and supplies agricultural inputs and training. It collaborates with the MoE in the CML on teak plantations and in training farmers on high-quality crops. The greenhouses it manufactures are seen as crucial for developing domestic vegetables and reducing the reliance of imports from Vietnam and China. Greenhouses allow for a steady production all year long, and therefore, allow for engagement in long-term sales agreements with premium buyers. IAT has been working with MAFF in setting-up 120 greenhouses across Cambodia, including in Kampong Speu, Kampong Chhnang, Pursat, and Battambang provinces.

High-quality vegetable production in greenhouses
Photo: Innovative Agro Technology

Project Alba is a social enterprise, created in 2011 in Cambodia, working towards establishing an inclusive and ecological food supply chain. Its approach follows 3 principles: producing high-quality vegetables by operating its own farms in innovative ways, producing inputs and tools that facilitate farmers' work, coaching farmers, and including them in the supply chains through contract farming schemes.

Azaylla is an agribusiness company that was established to create a sustainable, socially responsible agribusiness supply chain that benefits farmers, communities, and partners. It has been working to supply several major restaurants and large retailers with a wide range of fruits and vegetables. Azaylla worked with IAT to engage with farmers using greenhouses to produce GAP vegetables.

Certification will be limited to the best producers already meeting quality requirements for the premium markets. For other farmers, different sets of incentives will be necessary. For smallholder farmers who can join the certification process through contract farming with companies or cooperatives, the benefits can go beyond the price premium.[106] Through the certification process, smallholder farmers can get opportunities to improve their skills, develop networks, and better understand markets. An increasing number of farms target export markets for crops like mango, banana, and durian. Encouraging these farms to engage in contract farming with sustainability certification could positively impact the ecosystems while strengthening the long-term development of the sector.

Selection of appropriate lands for perennial crops and fruit trees. Cashew trees and other community-owned plantations have expanded into conservation and core zones of PAs, with potentially immense impacts on environmental services (e.g. PA Kulen). It will be important to identify appropriate degraded lands in development zones for these activities and to reflect those land allocations in the CPA management plans.

Incentivizing the retention of native cover is likely to work better than the regulatory ban of forest conversion, even if the two are not mutually exclusive. Several mechanisms to address how plantations of permanent crops are drivers of deforestation should be explored. For smaller actors, the potential of expanding the Ibis Rice model (Box 5) to other crops and commodities should be examined. Other mechanisms include tax credits for maintaining native tree cover, grants, and direct PES, under the condition of preserving native tree cover. Applying such models to agroforestry at scale will be a long-term, multi-stakeholder endeavor. However, challenges aside, such approaches are some of the most promising models for helping achieve conservation-friendly economic development and building climate change resilience across the landscape.

The potential of agroforestry application with permanent crops is widespread in almost all parts of the CML. That said, some crops are concentrated in specific areas. That is the case not only for the famous Pursat oranges, but also for several other crops, such as mangosteen and durian, that are widely planted in the Central Cardamoms.

Agroforestry production models can support additional activities that could significantly increase the job creation potential. The development of fruit processing downstream, such as juice products, can add significant value and create high-quality jobs, while contributing to the absorption of the seasonal production peak during harvesting season. Monofloral honey beekeeping using native bees can have great potential. Beekeeping combined with crops such as Longan and Lychee, which are widely available in the CML, produces high-quality honey and can improve fruit production by up to 60%.[107]

106 Ximena Rueda and Eric F. Lambin, "Responding to Globalization: Impacts of Certification on Colombian Small-Scale Coffee Growers," *Ecology and Society* 18, no. 3 (2013), https://www.jstor.org/stable/26269351.

107 "Longan Fruit Farmers' Demand for Policies Aimed at Conserving Native Pollinating Bees in Northern Thailand - ScienceDirect," accessed June 18, 2021, https://www.sciencedirect.com/science/article/abs/pii/S2212041615300371.

Box 8. Can wildlife farming benefit conservation?

For most species that are illegally traded, wildlife farming has the potential to exacerbate problems rather than solve them. Wildlife farming can benefit species conservation only if the following criteria are met:

Legal products a satisfactory substitute

- Consumers show no preference for wild-caught animals
- Quality and taste are considered equal to wild animal products
- Consumer behavior is not driven by status related to rare and wild animals

Demand is met and does not increase

- Wildlife farming can cover a substantial part of the demand
- Demand will not increase due to the legalized market
- Consumer demand will not shift to different species

Legal products will be more cost-efficient

- Wildlife farming is cost-efficient enough to combat the black market prices
- The biology of the species allows for cheap housing in artificial environments
- Species' reproduction rates are high enough to allow for high outputs
- Farmed products can outcompete the illegal market

No re-stocking from the wild

- Next generations are bred in captivity only
- Captive animals are not replaced with wild individuals

Laundering is absent

- Laundering of illegal products is absent
- False licenses and permits are avoided
- Other species cannot be disguised as captive-bred species
- Captive-bred products can be distinguished from wild products

(Adapted from: Laura Tensen, Under what circumstances can wildlife farming benefit species conservation?, Global Ecology & Conservation, Volume 6, 2016, Pages 286-298.)

4.6. LIVESTOCK AND CHICKEN FARMING HAVE POTENTIAL AS CONSERVATION-FRIENDLY ACTIVITIES

PREMIUM LIVESTOCK COULD BE CONSERVATION-FRIENDLY USING SILVO-PASTORALISM[108]

Livestock raising is an important component of livelihoods and security for households, but it does have some adverse environmental impacts. Promoting livestock is a classic livelihood development strategy in many programs and interventions that has improved the well-being of many communities. However, livestock represents a major contributor to climate change[109] and can be a significant driver of forest degradation and land-use change[110], although smallholders are responsible for only 31% of global emissions due to both agriculture and land-use change for agriculture.[111] In addition to increased emissions, increased land-use change for livestock has resulted in biodiversity loss. These pressures have been increasing due to the large-scale conversion of degraded grazing areas into plantations, ultimately displacing the pressure onto remaining forests.

For livestock interventions to be conservation-friendly, interventions should focus on integration into the landscape by promoting silvo-pastoralism. By integrating trees, forage, and the grazing of livestock in mutually beneficial ways, the economic improvements from livestock do not necessarily have to come at the

108 The practice of integrating trees, forage, and the grazing of domesticated animals in a mutually beneficial way.

109 United Nations' Intergovernmental Panel on Climate Change's (IPCC), "Special Report on Climate Change and Land" (IPCC, 2019).

110 Food and Agriculture Organization of the United Nations, *Forest Futures Sustainable Pathways for Forests, Landscapes and People in the Asia-Pacific Region*, 2019.

111 A rough estimate of the proportion of global emissions from agriculture due to smallholders. Sonja Vermeulen, Eva Wollenberg. CGIAR and CCAFS. 2017.

Box 9. Chicken farming to reduce hunting and improve livelihoods

In the Central Cardamoms NP, Conservation NGO Fauna & Flora International (FFI) has promoted chicken farming for conservation-friendly economic development. The approach developed by FFI focuses on supporting the different components of the market necessary for the long-term development of chicken production in remote areas.

All stakeholders are engaged, from veterinarians providing vaccines and treatments, suppliers providing feed, hatcheries providing chicks, MFIs providing the initial capital, to traders and consumers buying the chickens.

FFI trains and coaches Village Poultry Advisors who provide technical advice to farmers, selling inputs, and veterinarian products. These advisors receive a capital of US$ 100 for purchasing the initial stock. Families are given the equivalent of US$ 60 for the purchase of a coop and three hens.

expense of the environment. In addition, the promotion of products in connection with ecotourism sites would be beneficial for displacing potential pressure from wildmeat.

Silvo-pastoral models provide significant benefits for all stakeholders and the environment. Farmers get access to grazing land, and therefore, do not need to clear forests for grazing. Local farmers can benefit from improved genetic material, pasture management, and access to markets if a comprehensive approach is developed with the company. For the company, silvo-pastoralism increases local acceptance of the plantation and reduces social risks, and grazing improves fire management and weed control while also increasing site productivity due to fertilization by manure. In Lao PDR, such models have been implemented (see section 5.1) and have led to private-sector initiatives to develop technical and market packages to integrate goat farming within tree plantations. Such partnerships between the private sector and farmers should be piloted as part of CSLEP.

Forest farming of high-value livestock could add value for farmers and improve ecotourism experiences. For example, the forest farming of organic wild boar at ecotourism sites, integrated with high-diversity forest restoration models, adds value to the livestock and provides semi-natural wildlife experiences for tourists. It also provides conditions for the natural regeneration of formerly forested areas. These models may also result in negative emissions compared to conventional livestock farming systems.

Proper sanitation and food safety are especially important for wildlife farming. Wild meat consumption significantly increases the risks of zoonotic diseases.[112] Wildlife hunting has been a direct factor in the spread of SARS-CoV-1 and Ebola.[113] Today, the most likely origin of the COVID-19 is a zoonotic transmission through an intermediary host, according to a joint WHO-China study on the origin of COVID-19.[114] While the potential intermediate host and the modality of transmission of COVID-19 are still unknown, the risks associated with wild meat can be significant.[115] Therefore, measures must

112 Lauren Coad and Jasmin Willis, "Impacts of Taking, Trade and Consumption of Terrestrial Migratory Species for Wild Meat" (Secretariat of the Convention on Migratory Species (CMS), 2021).

113 Elizabeth H. Loh et al., "Targeting Transmission Pathways for Emerging Zoonotic Disease Surveillance and Control," *Vector Borne and Zoonotic Diseases (Larchmont, N.Y.)* 15, no. 7 (July 2015): 432–37, https://doi.org/10.1089/vbz.2013.1563.

114 WHO-China, "WHO-Convened Global Study of Origins of SARS-CoV-2," 2021.

115 *Global Emergence of Infectious Diseases: Links with Wild Meat Consumption, Ecosystem Disruption, Habitat Degradation and Biodiversity Loss* (FAO, 2020), https://doi.org/10.4060/ca9456en.

be implemented to reduce the risk of such outbreaks. Ensuring proper sanitation represents a significant obstacle to the safe promotion of this activity. Given these circumstances, acquiring an experienced private-sector partner would be essential before further venturing into and expanding this activity broadly.

Caution should be applied when promoting wildlife farming, given its history of negative impacts on conservation. Wildlife farming can benefit species conservation only if specific criteria are met (Box 8). For most illegally traded species, these criteria are unlikely to be met, so wildlife farming can further increase problems rather than solve them.

CHICKEN FARMING HAS THE POTENTIAL TO OFFSET ILLEGAL HUNTING

Chicken farming is a widespread activity for livelihood interventions in conservation projects. In the Central Cardamoms NP, Fauna & Flora International (FFI) has promoted chicken farming for conservation-friendly economic development (Box 9). In addition to increased nutritional and economic well-being, chickens provide an alternative to wild meat, thus reducing hunting pressure. So far, sales are primarily at the village scale, but in the case of ecotourism sites, sales can represent a substantial income opportunity for villagers aligned with sustainable ecotourism practices.

4.7. NON-TIMBER FOREST PRODUCTS (NTFP) ARE AT THE CROSSROADS BETWEEN CONSERVATION AND DEVELOPMENT

NTFP have been the focus of numerous projects and interventions. The emphasis of these has varied from conservation to economic development, depending on the motivations of the leading proponents.

NTFP comprise a wide range of products that are rarely clearly defined. For example, the FA includes charcoal, firewood, lower-class wood, and poles in its NTFP definition,[116] and Conservation International has agarwood in its NTFP value-chain stocktaking.[117] FAO uses the term Non-Wood Forest Products (NWFP) instead of NTFP, which explicitly excludes any wood products[118]. For this section on NTFP, we use the FAO definition of NWFP, which includes products collected or grown from natural or planted forests (see Appendix 2 for more details of this definition).

The importance of NTFPs for household livelihoods varies significantly across the CML. Income from NTFP ranges from US$50/household/year in the Phnom Aural and Phnom Samkos Wildlife Sanctuaries, to several hundred US dollars in other areas.[119]

116 Ministry of Agriculture, Forestry and Fisheries, "Prakas #132 on Non-Timber Forest Products" (Phnom Penh, Cambodia, March 2005).

117 Naven Hon et al., "Sustainable Landscapes and Ecotourism in Cambodia" (Phnom Penh, Cambodia: Conservation International, March 2019).

118 Global Forest Resources Assessment 2020 (FAO, 2020), https://doi.org/10.4060/ca8753en.

119 Valuation of Ecosystem Services in the Prek Tnoat Watershed (2nd Draft)" (UNDP: Phnom Penh, 2018).

WILD FOREST PRODUCTS

Wild forest products are defined as untended biological resources gathered from forests or wooded land (Appendix 2).

WILD HONEY – THE MOST COMMON NTFP IN THE CML

Most communities in the CML are involved in honey collection. One study found that all 20 of the communes surveyed participated in the collection of wild honey.[120] The COVID-19 crisis has impacted a share of this market, but given how widely wild honey is collected, there is good potential to expand this business to more communities over the CML, while following existing models for honey production.

The model promoted by Cambodian Federation for Bee Conservation focuses only on wild honey. This model was developed by an NGO (Box 10) and does not encourage beekeeping, as this would reduce community patrolling activities, and thus, the conservation impact of the business. **Beekeeping may only be appropriate in degraded areas.** One approach already being used in Cambodia is rafter beekeeping, which mimics large branches upon which bees form nests using poles in natural forests.[121] The company *Bee Unlimited* supports this technique and further improves community incomes by organizing tours in Siem Reap. Such a model could have potential in CML as part of agro-tourism development.

SEMI-WILD FOREST PRODUCTS

Semi-wild forest products are defined as biological resources, other than wood, that are gathered in forests or wooded land and are subject to some form of human intervention to increase productivity (Appendix 2).

RESIN – NOT WIDESPREAD NTFP IN THE CML

Resin is a significant source of income for some communities adjacent to forests in Cambodia. Resin is tapped by cutting a wedge-shaped opening at the base of a mature *Dipterocarpus* tree and setting a fire in the hole to stimulate resin production. Resin is collected from the hole after several days. It represents an important NTFP for many forest-adjacent households, especially in Prey Lang forest and forests in the Mondulkiri and Ratanakiri Provinces. One study in Prey Lang found that forest-adjacent households spent an average of 105 days, annually, on resin extraction, and they earned a mean annual gross income of US$3,236.[122]

Resin collection is much less common in the CML. Although resin trees exist in the CML, they are different from the species found in other parts of Cambodia, and the resin produced is much less valuable.[123] Only two of 20 communities surveyed in one study[124] and five of 41 households in another study[125] in the CML were involved in the collection of resin.

120 Nuppun Institute for Economic Research, "NTFP Value Chain Analysis - Phase 1: Prioritization of NTFPs" (Phnom Penh, Cambodia, March 2019).

121 Eric Guerin, "Rafter Beekeeping - Sustainable Management with Apis Dorsata" (WWF, 2019).

122 Anne-Mette Hüls Dyrmose et al. Economic importance of Oleoresin (*Dipterocarpus alatus*) to forest-adjacent households in Cambodia. Nat. Hist. Bull. Siam Soc. 62 (1): 67–84, 2017

123 Coad Lauren, Lim Sotheary, Nuon Lim. Wildlife and Livelihoods in the Cardamom Mountains, Cambodia.

124 Nuppun Institute for Economic Research, "NTFP Value Chain Analysis - Phase 1: Prioritization of NTFPs" (Phnom Penh, Cambodia, March 2019).

125 Coad Lauren, Lim Sotheary, Nuon Lim. Wildlife and Livelihoods in the Cardamom Mountains, Cambodia. Frontiers in Ecology and Evolution, Vol. 7 article 296. 2019.

Some companies are involved in the extraction of resin from pine trees. The Jin Jeng Company has been in discussions with the MoE for a 10-year master plan for this process, including Kampong Speu, Koh Kong, and Pursat provinces in the CML.

BAMBOO – A WIDE VARIETY OF USES THAT TEND TO BE OF LOW VALUE IN CAMBODIA

Bamboo is a widely available resource in the CML. It has been identified as a livelihood activity in 14 of the 20 communes studied in the CML.[126]

Bamboo can be used for a wide range of applications in the construction and manufacturing sectors. Applications include the structural elements, flooring, and walls in construction, furniture, houseware, and activated charcoal in manufacturing.

Most uses of bamboo in Cambodia are labor-intensive and have little value-added. Beyond the sale of raw bamboo to be used as scaffolding, bamboo is most commonly used for the production of incense sticks, barbecue sticks, and various handicrafts.

Bamboo sticks are suitable for community-level projects but suffer from little value-added. The production of bamboo sticks requires little investment in machinery, making it appropriate for decentralized production at the community level. Partnerships with the private sector for incense sticks production have been supported by several NGOs in Cambodia, including the World Wildlife Fund and Cambodian Rural Development Team, which funded equipment and training for local businesses, that, in return, committed to buying the products of communities (Figure 22). An independent evaluation of these models is required to assess their potential for the CML. Initial findings seem to indicate a low added-value and challenges in terms of production quality in the communities manufacturing them.[127]

The production of bamboo handicrafts focuses on international tourists. This scale contrasts with the high-skills, export-oriented village-to-factory-scale production in countries like Vietnam and China. The ability of Cambodia to compete at such a scale in this value-chain is uncertain.

Some examples of higher-end bamboo production exist in Cambodia, but they are small-scale. While some companies, like Bambusa, produce higher-end handicrafts, such as coil plates and bowls for export, it remains at relatively small-scale. Larger scale production for construction and international furniture markets is only possible in cooperation with specialized companies, possibly requiring the introduction of new species to become profitable.

Most projects linked with bamboo production are located outside the CML. Most bamboo projects are located in the Mondulkiri Province and the provinces along the Mekong river: Stung Treng, Kratie, and Kampong Cham.

Based on the current situation, the potential for private-sector partnerships in bamboo appears limited in the CML. There is a lack of understanding of which bamboo species occur in the CML and what products they could be used to produce. The development of plantations along rivers and streams to contribute to reducing erosion while supporting income generation could represent an interesting potential to be studied.

126 Nuppun Institute for Economic Research, "NTFP Value Chain Analysis - Phase 1: Prioritization of NTFPs" (Phnom Penh, Cambodia, March 2019).

127 Nuppun Institute for Economic Research, "NTFP Value Chain Analysis - Phase 2: Value Chain Studies" (Phnom Penh, Cambodia, March 2019).

Box 10. Cambodian Federation for Bee Conservation (CWHE)

The CWHE aims to contribute to protecting Cambodia's forest resources and improving the livelihoods of communities through the sustainable collection of wild honey and increasing the quality of wild honey products. The CWHE established common standards in terms of sustainable harvesting practices, quality, hygiene, and conservation impact.

The company Nature Wild, the business arm of NGO NTFP-EP, has been working for many years to support the production of wild honey from natural forests in the Koh Kong Province. They supported the creation of CWHE and community-based Wild Honey Enterprises. They are now training collectors, packaging, promoting, and distributing the honey to retailers in Phnom Penh and hotels and restaurants across the country.

RATTAN – A DECLINING SECTOR WITHOUT HIGH-END PRODUCTS NOR EXPORT COMPETITIVENESS

The domestic market for rattan has been in constant decline over the past several decades. Rattan has been mainly used for furniture manufacturing in Cambodia. With the increasing purchase power, households tend to prefer wood furniture over rattan, causing demand to decline. Current demand for rattan products is limited to a few products, such as bookshelves and shoe racks used by students and lower-income households, and furniture for hotels, guesthouses, and restaurants targeting international tourists. In 2015, income for workers at rattan furniture workshops was around US$52/month[128], only about 40% of the minimum wage of a garment factory worker, excluding overtime and benefits.[129] As demand and margins from rattan furniture manufacturing continue to decrease, several manufacturers have been pushed out of business,[130] and others have transitioned to manufacturing wood furniture.

There is demand for high-end rattan furniture in Cambodia, but it is difficult to find manufacturers to produce it. One premium furniture retailer in Phnom Penh is interested in developing higher-end rattan furniture, but this retailer finds it difficult to find manufacturers with the skill and vision to create quality, contemporary designs.

The export sector for rattan is small and will struggle to compete with larger players. Only two Rattan Association of Cambodia members are exporting to international markets: Khmer Rajana Rattan Handicraft and Manava. If Cambodia is to compete with big international exporters of rattan furniture, such as Vietnam, it will need to support creative actors with innovative designs for niche products and markets.

Farming bamboo and rattan is currently not profitable as a village enterprise. Given the low prices of rattan and bamboo, forest restoration models based on these species appear to not be profitable[131] (Figure 23). Allowing smallholders to gain FSC certification could bring added value to communities, while supporting the competitiveness of manufacturers for exports.

128 Koulang Chey, Ousopha Prak, and Tam Le Viet, "Sustainable Cottage Industries and the Rattan Association of Cambodia" (WWF Greater Mekong, September 2015).

129 International Labour Organization, "Cambodian Garment and Footwear Sector Bulletin" (Phnom Penh, Cambodia: ILO, March 2016).

130 Nuppun Institute for Economic Research, "NTFP Value Chain Analysis - Phase 2: Value Chain Studies" (Phnom Penh, Cambodia, March 2019).

131 "Building out a Toolkit for Restoration: Economic Assessments from Peru, Indonesia and Cambodia" (Conservation Strategy Fund, November 2019).

Figure 22. Community-based production bamboo incense stick in Kratie Province.

Photo: *CRDT*

Still, the bamboo and rattan sectors are dynamic. Cambodia joined the International Bamboo and Rattan Organization (INBAR) in late 2019. This international organization aims to promote South-South cooperation for the development of a sustainable bamboo and rattan sector.

Large-scale bamboo plantations are planned for other parts of Cambodia. The Ministry of Agriculture, Forestry, and Fisheries (MAFF) announced in 2019 that it would provide 40,000 ha to grow bamboo and rattan.[132] Several plantation-scale projects aim to develop higher-added-value products. Leopa signed a Letter of Understanding with FA to develop a cross-laminated bamboo plywood plant and an acacia plantation in the Stung Treng Province on former ELC land, and it is looking for investors. The Malaysia-based Lipp Engineering Sdn Bhd also recently announced plans to establish 25,000 ha plantations and build a large-scale bamboo processing plant to produce fiber, likely for the garment sector.

132 Government to Provide 40,000 Hectares to Grow Bamboo and Rattan," Khmer Times (blog), June 26, 2019, https://www.khmertimeskh.com/50617935/government-to-provide-40000-hectares-to-grow-bamboo-and-rattan/.

MANAGED FOREST PRODUCTS – CARDAMOM, TURMERIC, GINGER, AND LEMONGRASS

Managed forest products (also called forest farming) is a type of agroforestry that aims to combine the production of crops while keeping or restoring the native tree canopy cover. This model is tailored for the production NWFPs, such as high-value spices, herbs, and ornamentals, such as orchids.

Managing forests to increase yields of NTFPs increases incomes, but it has varying impacts on biodiversity and ecosystem services. For example, traditional cardamom cultivation in the understory of natural forests in Sri Lanka leads to the disturbance of the local ecology.[133] Conversely, in cacao-based agroforestry systems, despite reducing canopy cover by 40-80%, there are only minor impacts on biodiversity and ecosystem services, while farmers' incomes are doubled.[134]

Forest farming should not be applied in areas of high conservation value. The common interventions in forest farming — opening the canopy, removing understory species, and applying fertilizers and pesticides — impact native ecosystems to some extent. Therefore, such systems should be applied to already degraded forest areas.

CARDAMOM – HIGH VALUE AND IN DEMAND

Forest farming of high-value cash crops, such as cardamom, appears as a promising option for sustainable livelihoods in the CML. These systems should be applied in already degraded forest areas and should be combined with ecosystem restoration using tree plantations.

Cardamom is the signature product of the CML and is of high value and in high demand. Cardamom is a high-value spice used in cuisine and as a medicinal plant. The main market is China, but limited supply means demand outstrips supply for even the domestic market. For medicinal uses, cultivated cardamom is preferred as it tends to have a higher concentration of essential oil compared to the wild-grown cardamom.[135]

Cardamom only grows at higher elevations, but such areas exist in the CML. Cardamom is extremely sensitive to elevation, and the right choice of cultivar is essential for good productivity. The optimal range for cardamom is 600-1,500 m elevation. Given this, the potential for such a crop is limited to Ou Saom and Tatai Leu in the Central Cardamom NP, and in higher elevation parts of the Phnom Aural and Phnom Samkos Wildlife Sanctuaries (Figure 24).

There is a lot of interest in cardamom, but currently, there is only limited trade in Cambodia. Despite good market demand, the availability of wild cardamom appears to have significantly decreased in recent years in Cambodia, and previous studies could not identify active traders.[136]

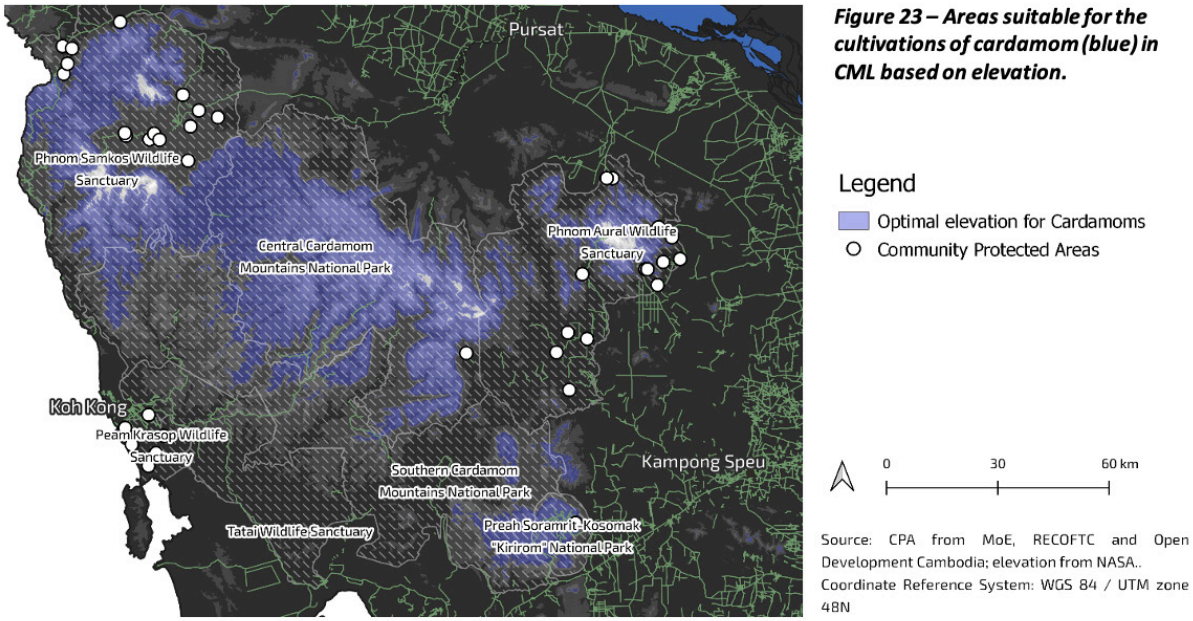
133 Balram Dhakal et al., "Impacts of Cardamom Cultivation on Montane Forest Ecosystems in Sri Lanka," F*orest Ecology and Management* 274 (June 15, 2012): 151–60, https://doi.org/10.1016/j.foreco.2012.02.021.

134 Ingolf Steffan-Dewenter et al., "Tradeoffs between Income, Biodiversity, and Ecosystem Functioning during Tropical Rainforest Conversion and Agroforestry Intensification," *Proceedings of the National Academy of Sciences* 104, no. 12 (March 20, 2007): 4973–78, https://doi.org/10.1073/pnas.0608409104.

135 Olivier Ducourtieux, Phoui Visonnavong, and Julien Rossard, "Introducing Cash Crops in Shifting Cultivation Regions – The Experience with Cardamom in Laos," *Agroforestry Systems* 66, no. 1 (January 1, 2006): 65–76, https://doi.org/10.1007/s10457-005-6645-1.

136 Nuppun Institute for Economic Research, "NTFP Value Chain Analysis - Phase 2: Value Chain Studies" (Phnom Penh, Cambodia, March 2019).

Figure 23. Areas suitable for the cultivations of cardamom (blue) in CML based on elevation.



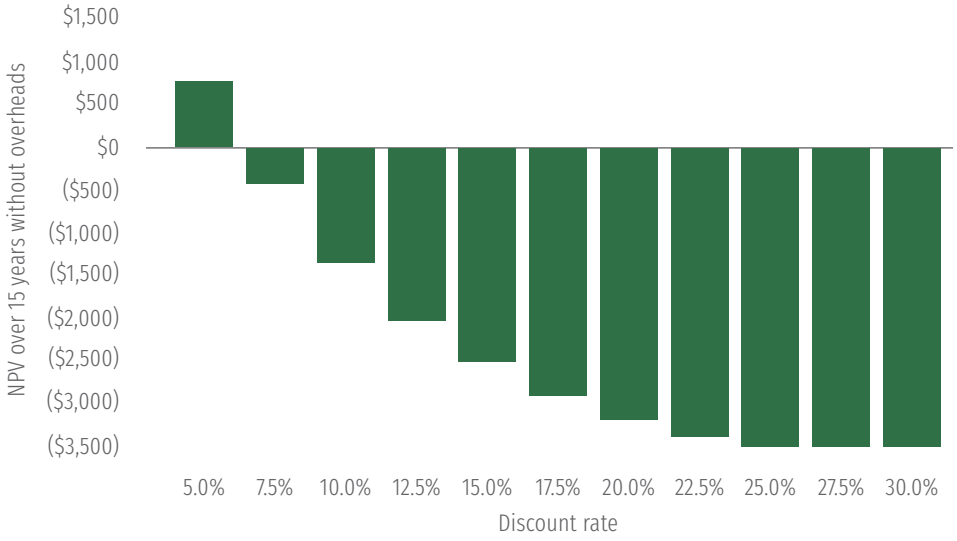
There is great potential for conservation-friendly cardamom cultivated in the understory of degraded forests. This high-value NTFP with a distinct Cambodian 'brand' would be ideally suited to an approach such as that used for Ibis Rice (Box 5) and well as the registration of a Geographical Indication (GI). Iconic Cambodian products such as Kampot Pepper and Kampong Speu Palm Sugar have already been registered under the Geneva Act of the Lisbon Agreement on Appellations of Origin and Geographical Indications and given international recognition of the brand. Such an approach must be led by the private sector but would strongly benefit from government support. Some private companies have also already offered to engage in the Cardamom Mountains and to collaborate with local communities.

TURMERIC, GINGER, AND GALANGAL – UNECONOMIC USING CURRENT MODELS

A pilot for forest farming of spices is being undertaken in the CML. The model uses a forest farming approach to restore degraded forests by planting clusters of native trees with shade-tolerant spices (turmeric, ginger, galangal, and lemongrass; Box 11).

The current model is not economically viable for the community. A positive NPV is only reached with a discount rate of 5%, considerably above the 20% used by MFIs, thus rendering this approach uneconomic (Figure 25). Under the current assumptions, such a model is likely to attract neither communities nor private-sector investment.

Figure 24. Net Present Value of the Forest farming model under different discount rate.



Data: *Adapted from Conservation Strategy Fund using author assumptions*

A partial subsidy and use of high-value timber could make this approach viable. If a subsidy for land preparation were provided and high-value timber, such as agarwood, were used, a positive NPV would be achievable at a discount rate of 20%. This would make it attractive to both communities and the private sector. Companies such as Krassna Cambodi have been working on turmeric and agarwood in the CML, and they could be possible partners for such models.

Box 11. Forest farming of spices in the Cardamom Moun-tains

Caritas Switzerland has been piloting the forest farming of turmeric, ginger, galangal, and lemongrass in a Community Forest (CF) of Pursat province in the CML. The model aims at the restoration of the degraded forest through planting clusters of native trees with spices that grow well under shade and in the acidic sandy loam soils found in CFs.

The model is a community enterprise where 30% of farmers' incomes are shared with the CF Management Committee and used to finance the CF Development Fund that covers costs of forest management and development.

There are significant difficulties with this model in terms of management and sub-optimal economic performance. Based on preliminary evaluation, a positive NPV is achieved only with a discount rate of 5%, considerably below the 20% offered by MFIs. As a result, this model is not viable for communities.

Figure 25. Lemongrass essential oil, sold in retail outlets and spas in cities; grown by communities in Central Cardamoms National Park.

Photo: *Fauna & Flora International*

LEMONGRASS ESSENTIAL OIL – A NICHE PRODUCT THAT IS NOT GREATLY REPLICABLE

A partnership between a community, NGO, and private-sector partner produces lemongrass oil for stores and spas in urban and tourism centers. Farmers cultivate the lemongrass with Flora and Fauna International (FFI) and Bodia Cambodian Apothecary, who provide technical support and funding (Box 12 and Figure 26).

Despite a relatively high price, the longer timeframe for a return on investment for lemongrass oil makes it difficult to compete. Returns for banana production in plantations, one of the main deforestation drivers in the region, provide greater returns in a shorter time and are therefore more attractive to farmers.

Increasing production, diversifying markets, and adding value are priorities for making this model more viable. Currently, the product is not packaged, and the community does not have access to other markets or a platform to receive orders. FFI is working with the community to address this challenge. Consideration should be given to building on this model, rather than looking at replicating it at other sites.

Box 12. Essentials oils from Central Cardamoms National Park

A partnership between communities in Tatai Leu, Central Cardamoms National Park, Flora and Fauna International (FFI), and Bodia Cambodian Apothecary supplies lemongrass essential oil to stores and spas in Phnom Phem and Siem Reap. The lemongrass is cultivated by farmers (nine women, and one man who acts as manager and bookkeeper). Bodia provides technical support in setting up the production unit as well as buying the essential oil, and FFI supports the community in business and production management.

Increasing production, diversifying markets, and adding value are priorities for making this model more viable. A flask of 10 ml of lemongrass essential oil retails around US$ 5-7 in Phnom Penh, whereas the Tatai Leu community sells their unpackaged production at an equivalent of US$ 1 for 10 ml. The community sells raw essential oil to Bodia because it is not able to filter the oil and package it for other markets, and it does not have a platform to receive orders. Bodia encourages the community to sell the essential oil to other companies, because if the community increases production and decreases production cost, all the actors in the supply chain will benefit. FFI is currently working with the communities to develop packaging at the production facility, but significant capacity development will still be required for managing suppliers and customer relationships.

Bodia pays significantly more than the market price of lemongrass oil from Thailand, and spends significant efforts in supporting community production, indicating that this partnership is also based on corporate social responsibility and marketing of a high-quality 'made in Cambodia' product. Despite a relatively high purchase price for a product produced in the village, the longer return on investment for this product makes it difficult for it to compete with banana production, one of the main deforestation drivers in the region.

05

BARRIERS TO ENABLING CONSERVATION-FRIENDLY ECONOMIC DEVELOPMENT

A RELATIVELY WEAK REGULATORY FRAMEWORK

The Ministry of Environment (MoE) is responsible for overall environmental governance in Cambodia. That given, environmental governance is a cross-sectoral issue that requires strong collaboration with other agencies, most notably, the Ministry of Agriculture, Forestry and Fisheries (MAFF). For a summary of the jurisdiction of these two agencies, see Box 13.

Significant strengthening of the legal framework that enables conservation-friendly development is required. The review detailed in this report of the primary laws, sub-decrees, and Prakas[137] (we use Prakas and declaration interchangeably in this report) shows that the legal framework varies significantly depending on the type of intervention considered, but it is generally weak. The following sections outline those weaknesses and possible remedies.

5.1. PROTECTED AREA REGULATIONS

PAs in Cambodia are governed by the Protected Area Law (2008). Article 1 states *"This law defines the framework of management, conservation, and development of protected areas."*[138] Several zones are defined within PAs, including Sustainable Use Zones (SUZ) in which the Community Protected Areas (CPAs) are located. For a description of CPAs and the zones within PAs see Box 2.

ACTIVITIES ELIGIBLE IN SUSTAINABLE USE ZONES

Allowable activities in the Sustainable Use Zone are restrictive for local communities. Chapter 4, Article 11 of the PA Law (2008) allows development and investment activities in the SUZ. However, Chapter 5 of the PA

Box 13. Jurisdiction for natural resource management in Cambodia

The Ministry of Environment (MoE) is responsible for implementing the Protected Area Law and associated regulations, which govern National Parks, Wildlife Sanctuaries, and other types of Protected Areas. In addition, the MoE manages the Community Protected Areas (CPAs) within it. Overall, the MoE's jurisdiction spans over 41% of Cambodia's land (For a description of CPAs and the zones within PAs, see Box 2).

Ministry of Agriculture, Forestry and Fisheries (MAFF) is responsible for implementing Forestry Law and associated regulations, among other duties. The Forestry Administration (FA) is an authority under MAFF responsible for managing the Permanent Forest Estate (incl. Production Forests) and Community Forests. FA has jurisdiction over the transport of timber and non-timber products outside of PFE and PAs and is in charge of overall law enforcement for trade violations. It also oversees the REDD+ mechanism in Cambodia. In addition, MAFF is responsible for ELCs and wildlife trade, both domestically outside PAs and internationally, including administering CITES in Cambodia.

137 A Prakas is a ministerial or inter-ministerial declaration signed by the relevant minister(s). A Prakas must conform to the Cambodian Constitution and to the law or sub-decree to which it refers.

138 Protected Areas Law 2008, Article 1.

Law as well as the zoning guidelines[139] do not include commercial activities beyond the collection of NTFPs for traditional and customary use by local communities.

A declaration is needed to allow further economic activities in Sustainable Use Zones – under certain conditions. This should define eligible activities in line with conservation principles, which will provide some form of security to investors. Given that economic activities can impact natural resources, in some cases, management plans will be required, and safeguard processes must be applied.

CPAS FACE RESTRICTIONS ON COMMERCIAL FOR-PROFIT ACTIVITIES

The CPAs' purpose is to achieve a balance between sustainable natural resources management and local socio-economic development. The PA Law Lexicon defines CPAs as *"Participation of local communities or indigenous ethnic minorities in an elected form of administrative structure, recognized by the Nature Protection and Conservation Administration, with the joint purpose of management and sustainable use of natural resources in a particular part of the protected area, aimed at promoting the standards of living of the local community and indigenous ethnic minorities."*

Nevertheless, economic activities for CPAs are highly restricted in current regulations. According to the PA Law (2006) uses of natural resources within a SUZ are limited to traditional uses and customary practices at the family-scale (Article 22). Furthermore, such activities in the SUZ are limited to activities within the CPA (Article 23), and communities may not have the right to work forestlands in CPA (Article 26). Article 6.4(d) in the Guideline on Procedure and Process for Community Protected Area Establishment (2017states that in writing its management plan, the CPA may only look to a future possibility of engaging in "small scale enterprise opportunities which are potential in community and climate change adaptation strategy." These provisions considerably limit opportunities for communities to engage in economic development.

In addition, CPAs suffer from burdensome regulations to operate formally. The 2002 Forestry Law's chapters on Permits and Authorizations (Articles 24 to 27), and on Prohibition on Harvesting Forest Products & By-Products (Articles 28 to 39), are either burdensome or outright prevent activities that would be useful from a CFEA business standpoint. Given the small scale of the CPAs, these complex regulations significantly increase the cost of operation compared to larger-scale businesses.

COMMUNITIES CANNOT DIRECTLY ENGAGE IN PARTNERSHIPS WITH THE PRIVATE SECTOR

The present legal framework contains no provisions allowing CPAs to engage in partnerships with the private sector. CPAs cannot sign contracts except with MoE. The Guideline on Procedure and Process for Community Protected Area Establishment (2017) states in Article 21 that "the CPA committee shall have rights, roles and responsibilities as below: Represent CPA to sign agreements on CPA management with the General Directorate of Local Community of the Ministry of Environment." Neither the guideline nor any other law or regulation contains provisions on the right of CPAs to contract with private organizations.

A legal avenue is required to enable communities to engage with the private sector to restore degraded lands and to increase their user rights beyond traditional or customary uses. Such provisions are needed to promote conservation-friendly economic development models in collaboration with the private sector.

139 GDANCP, "Zoning Guidelines for the Protected Areas in Cambodia" (Phnom Penh, Cambodia: General Directorate of Administration for Nature Conservation and Protected, Ministry of Environment, 2017).

CPAS' AGREEMENTS WITH MOE PROVIDE WEAK TENURE PROTECTION

Investment in forestry requires longer than the current 15-year agreements for CPAs. The PA Law (2008) sets a 15-year period for CPA agreements with MoE (Article 25). This duration considerably limits the viability of many business models that require longer-term engagements, especially in forestry. Even in the case of fast-growing tree plantations, if investors cannot be guaranteed at least two crop rotations, they are unlikely to commit to a project. The 15-year limit means development models providing long-term benefits will not be viable, which goes against sustainable landscape management.

CPA agreements should be increased to at least 30 years. A 30-year agreement appears to be the minimum necessary to attract private investors and create long-term shared value. This duration still remains much lower than that granted under ELCs or PPPs with the Forestry Administration and might need to be further expanded as the sector matures to allow for higher-value timber production.

A 2020 circular might result in CPAs' loss of land. A 2020 circular that allows households that have been living inside PAs for 10 or more years to claim official land title potentially provides tenure security for individual families, but it also has the potential to fuel land speculation and to promote the fragmentation of PAs and CPAs. (Circular 06 on Measures and Criteria of Granting State Property to Citizens and Civil Servants [2017]).

THERE IS A LACK OF MANAGEMENT PLANNING IN COMMUNITY ZONES

In addition, there is a lack of management planning and government engagement in Community Zones to promote CFEA. Community Zones are complex due to the existence of villages and agricultural fields. Article 11 of the PA Law states that: "Issuing land title or permission to use land in this zone shall have prior agreement from the Ministry of Environment in accordance with the Land Law." While many PAs haven't been properly zoned yet, there is a lack of management plan and governance in Community Zones. The development of management plans accepted by the local stakeholders and their enforcement is essential to achieve socio-economic and conservation objectives. It is also a prerequisite to attract responsible investors in CFEA and support the development of CFEA with PES such as Ibis Rice.

5.2. FISCAL REGULATION RELATED TO FOREST PRODUCTS

APPLICABLE FEES AND ROYALTIES FROM CPAS

The Cambodian regulatory framework regarding forest products strongly favors private-sector investment in forest plantations rather than the sustainable management of natural forests. Owners of private plantations registered to the FA are exempted from harvesting, processing, and transportation fees of timber and non-timber forest products (Forestry Law article 52; Declaration on the Development of Private Forest Article 9). On the other hand, forest products and by-products from natural forests, including CFs and, by extension, CPAs, are required to pay premium and royalty fees. This anomaly penalizes all the wood products that could be produced in CPAs, despite their social and environmental impact, and should be addressed to support the development of CFEA.

INCENTIVIZING INVESTMENTS IN PAS AND CPAS

Obstacles to doing business in CPAs should be removed and incentives should be promoted. Doing business in Cambodia is already relatively difficult. Cambodia is ranked 144 out of 190 countries regarding the ease of

doing business.[140] For the reasons outlined above, doing business in PAs involves significant additional burdens and risks to investments. It is, therefore, essential to have a regulatory framework incentivizing projects that benefit conservation and local development.

Exemptions for qualified investments could be extended to smaller-scale partnerships with the private sector in CPAs. Cambodia already has fiscal incentives to encourage investments under the Qualified Investment Project. This program provides an exemption from import, export, and profit taxes for a given period.[141] Still, it restricts the fiscal benefits to large-scale plantations only (>1,000 ha for teak plantations and 200 ha for short-rotation crops). An amendment should be made to allow smaller-scale private sector partnerships in PAs to meet the necessary safeguards to benefit from the same fiscal regulation, thus increasing their competitiveness in the market.

5.3. LACK OF SECURITY IN LAND TENURE LIMITS INVESTMENTS AND LOCAL OPPORTUNITIES

Lack of security of land tenure and conflict over land are the primary causes of concern for investors and project developers in Cambodia. These issues must be addressed to achieve sustainable landscape management and support conservation-friendly economic development.

Highly uncertain and contested land tenure is a source of conflict affecting many stakeholders. That is true in many parts of Cambodia, and notably, in the CML. The lack of clarity of tenure poses threats to vulnerable people at risk of losing access to land. Besides, uncertain and contested land tenure impacts businesses with delays, additional costs, and reputational risks. These risks tend to deter responsible investors and restrict activities to only those over short-term projects with a very high return on investment. As a result, there is little potential for businesses to engage in more inclusive activities with high conservation co-benefits. For example, the Ibis Rice model requires secure land tenure with all fields mapped within the Community Zone of a PA that has been zoned and where there is an agreed-upon land-use plan (Box 5).

The Economic Land Concession (ELCs) scheme was designed to attract long-term investment in the agricultural and forestry sectors. ELCs granted land concessions to private companies for up to 50 years. In theory, the objectives of the scheme were similar to what those of private sector engagement on CFEA in PAs should be: to support *"employment in rural areas within a framework of intensification and diversification of livelihood opportunities and within a framework of natural resource management based on appropriate ecological system."*[142] In practice, access to land and livelihoods for many households were impacted, even in the case where the ELC provided employment opportunities[143], and large areas of forest experienced land-use change.[144]

140 he World Bank, "Doing Business 2020: Comparing Business Regulation in 190 Economies" (Washington, DC, 2020).

141 The Law on the Amendment of the Investment Law (2005)

142 Royal Government of Cambodia, "Sub-Decree on Economic Land Concessions - Unofficial Translation." (Phnom Penh, Cambodia, December 27, 2005).

143 Petr Drbohlav and Jiri Hejkrlik, "Social and Economic Impacts of Land Concessions on Rural Communities of Cambodia: Case Study of Botum Sakor National Park," *International Journal of Asia Pacific Studies* 14 (January 15, 2018): 165–89, https://doi.org/10.21315/ijaps2018.14.1.7.

144 Kyle Frankel Davis et al., "Accelerated Deforestation Driven by Large-Scale Land Acquisitions in Cambodia," Nature Geoscience 8, no. 10 (October 2015): 772–75, https://doi.org/10.1038/ngeo2540.

A "Leopard-Skin" approach has been promoted by RGC to develop activities around the smallholders to avoid displacing them. To address the challenges of the ELC model, the RGC promotes the leopard skin model where "actual possession" is considered, even if it is not legally recognized. Where this model has been used, concessionaires have in some cases even supported the titling of smallholder farms. The approach was legalized in 2012 and expedited the systematic issuance of private land titles. It also directed companies not to develop land cultivated by local communities.[145]

The "Leopard-Skin" approach still encounters difficulties for developers. The approach relies heavily upon uneven power relationships, at the local level, for negotiations over land between local communities, concessionaires, and state officials. Unscrupulous land brokers have played a role in alienating farmers from the land and then selling it to companies at a high margin.[146]

Successful conservation-friendly development in CPAs will need to address the land issues that have plagued other models. The CPA zoning process has not always been fully understood by households, resulting in the allocation of some forested land owned by families as CPAs during land-use mapping workshops.[147] Most village and commune authorities allow farmers to expand their farms in CPAs, which opens the door to speculation on CPA land and land grabbing by powerful actors.

A new directive allows households that have been living inside PAs for 10 years or more to claim an official land title. To address this issue of land grabbing and illegal land-use change, in July 2020, the RGC published a circular allowing households that had been living inside PAs for more than 10 years to claim a land title.[148] In the short term, this procedure might create some uncertainty. Still, it could reduce potential conflicts from unclear land tenure in PAs and CPAs in the long term. However, careful monitoring must ensure that it does not increase land grabbing and fuel land speculation in already vulnerable CPAs.

For communities in CPAs to benefit from new titling opportunities, Prakas and management plans are urgently needed. Many of the CPAs with good potential for CFEA do not have a Prakas or management plan. Those that do have such plans often lack proper demarcation, making the land vulnerable to land grabbing and attractive to investors. These functions of the PA management must be given priority.

5.4. INADEQUATE SKILLS AND TRAINING OF LOCAL PEOPLE AND WEAK INSTITUTIONAL CAPACITY

There is a strong need for Technical and Vocational Education and Training (TVET) on CFEA. The CFEA significantly differs from business as usual with the integration of multiple production models (e.g. agroforestry models) as well as a focus on high-value production (e.g. forest farming models). Due to these differences, significant TVET is needed to support CPA members in adopting these CFEA and playing a stronger role in partnerships with the private sector. Identifying the most promising CFEA in each CPA and technical skills of CPA members on these value chains is essential to support conservation-friendly development.

145 Directive 01BB: Measures Reinforcing and Increasing the Efficiency of the Management of Economic Land Concessions

146 Dwyer, Michael B., Emily Polack and Sokbunthoeun So (2015) "'Better-practice' Concessions? Some Lessons from Cambodia's Leopard Skin Landscape" in *Large-Scale Land Acquisitions: Focus on South-East Asia*, International Development Policy series No.6, Geneva: Graduate Institute Publications, Boston: Brill-Nijhoff, pp. 205–228.

147 Sopheak Chann, "Making Place and Creating Frontiers: Examining Land and Resource Struggles in Cambodian Post-Conflict Resource Landscapes," *The Geographical Journal*, November 13, 2019, https://doi.org/10.1111/geoj.12340.

148 Circular 06 "Granting State Property to Citizens and Civil Servants". https://www.phnompenhpost.com/national/minister-tells-governors-speed-land-allocation

The skills and training of local people may not be adequate for the enterprises needed. An inadequately educated workforce is among the top constraints that businesses face in Cambodia.[149] While highly heterogeneous, the people living in PAs are poorer and have lower levels of education than the national average. People may lack both the "hard" and "soft" skills required for meaningful participation in new enterprises. Private companies wanting to invest in CFEA will likely have difficulties finding the local labor with the hard skills they need and will face significant training costs for their operations. In addition to hard skills, there is a general lack of "soft" skills in the labor force, in terms of communication, critical thinking, and problem-solving skills, which will affect the most innovative CFEA.[150] Identifying training needs for local people and addressing them is required as a prerequisite to meaningful engagement of locals in new enterprises.

Sufficient capacity of CPA Management Committee is critical for the implementation of community-based CFEA.[151] Good organization and mobilization of community members, and good management of finances for maintenance and re-investment activities are essential for any enterprise, but are especially important for longer-term investments needed for some CFEA. While private-sector partners may assist in addressing this challenge, the limited CPA capacity will impede business models that rely heavily on CPA Management Committee or farmers' cooperatives. Identifying and addressing training needs for CPA committees is required as a prerequisite to meaningful investments in CPAs.

Models relying on contract farming will struggle with low levels of professionalism among farmers. Few farmers in remote areas see agriculture as a business that they are willing to invest in developing. Identifying entrepreneurial farmers and supporting them in improving their capacities is essential for a contract-farming approach to thrive. In addition, household debt is high in rural Cambodia, thus preventing some households from being able to invest. Addressing these issues will require investment or guarantee beyond the private sector partner, as the need to build capacity among contract farmers and investment in their operations increases the costs of the contract farmer model compared to conventional farming, thus challenging the competitiveness of this model.

5.5. HIGHER COSTS TO ACCESS MARKET AND INFRASTRUCTURE

Remote areas often lack basic infrastructure, such as reliable water, electricity, and all-weather roads. In many areas where needed infrastructure does not exist already, investors in Cambodia are required to build their own. This, however, significantly increases the costs of operations. For some of the already marginal value chains detailed in this report, the cost of infrastructure may render them uneconomic. That will be an issue, especially when working with a mosaic of CPAs, thus multiplying infrastructure development complexity. Besides, a wide range of necessary inputs might not be locally available, requiring the enterprise to secure supply itself.

149 2016 Cambodia Enterprise Survey. World Bank Group. 2016. https://elibrary.worldbank.org/doi/abs/10.1596/28473

150 Wendy Cunningham and Claire Honore Hollweg, "Cambodia's Future Jobs: Leveraging Integration for Better Jobs" (Washington, DC: World Bank, n.d.).

151 USAID ProLand, "A Sourcebook for Community-Based Forestry Enterprise Programming: Evidence-Based Best Practice and Tools for Design and Implementation." (Washington, DC: USAID, 2020).

5.6. COMPETITION WITH THE INFORMAL SECTOR

Conservation-friendly enterprises cannot always compete with products from the informal sector. This situation is especially true for value chains dominated by the informal sector (e.g. charcoal) with high costs linked to certification or other formalization. Competition with the informal sector is the top constraint businesses face in Cambodia.[152] In the case of CFEA, private companies may have to compete against businesses with poor environmental and social practices that do not pay VAT or any other taxes and do not adequately compensate or care for their workforce.

Added incentives are needed for sectors exposed to competition from the informal sector. Commercial development of NTFPs and forest products, like charcoal, that face unfair competition from the informal sector should be granted incentives, such as VAT exemptions, to allow the enterprise to develop and transition the sector towards better social and environmental performance. These fiscal incentives could be granted for investments inside PAs in collaboration with CPA members only and could be based on their positive social and environmental externalities.

152 2016 Cambodia Enterprise Survey. World Bank Group. 2016. https://elibrary.worldbank.org/doi/abs/10.1596/28473

06
PLANNING FOR CONSERVATION-FRIENDLY ECONOMIC DEVELOPMENT

This section of the report will focus on planning for conservation-friendly development in PAs and CPAs. This includes multi-stakeholder platforms to support dialogue, mapping potential areas for each CFEA, synergies with infrastructure development, building stakeholder readiness to engage with the private sector, and Free, Prior, and Informed Consent (FPIC).

ESTABLISH A MULTI-STAKEHOLDER PLATFORM TO SUPPORT DIALOGUE AND A SHARED VISION FOR CFEA IN PAs

Private-sector investment in PAs has not resulted in the desired conservation outcomes in the past. Positive narratives of conservation outcomes did not always materialize from previous attempts at private-sector partnerships. If the root causes of these failures are not understood, new partnerships might push the conversion of natural ecosystems further.

Developing sustainable pathways for economic development in PAs requires system thinking and better inclusion of the agency of private actors, government, and local stakeholders. The various actors operating in these landscapes (indigenous communities, migrant workers, land investors, private companies, conservation NGOs, and the government) have fundamentally different objectives, knowledge, and visions. For collaboration to happen, it is not necessary to share a common goal or even to have a shared vision of the future of the landscape, but it is necessary to have a shared understanding of how the world works and how it could change to explore sustainable pathways.[153]

Workshops linking local and regional businesses with communities and NGOs have good potential to identify sustainable pathways for economic development. Such workshops could support the CFEA identification as well as building local capacities and building connections between stakeholders. It could also contribute to the development of a Theory of Change which could become a roadmap for conservation-friendly economic development in the landscape.

The Theory of Change (ToC) approach has great potential as a tool for stakeholder engagement and the collective testing of the assumptions.[154] The ToC focuses on understanding how the system works, and therefore, pushes the actors to explicitly state their collective beliefs and reveals differences in the assumptions among stakeholders.[155] Building prospective scenarios together with the different stakeholders can support identifying potential pathways for developing applicable CFEA and what is required to get to the desired outcome.

A Theory of Change for CFEA in the landscape should be developed and regularly updated. That would support better integration of CSLEP project components, bringing synergies and mitigation of potential adverse outcomes. This approach will help to identify suitable value chains, CFEA, locations, and private sector partners. It will also assist in avoiding investing in areas where the socioeconomic and ecological dynamics are not favorable.

153 Claude A. Garcia et al., "The Global Forest Transition as a Human Affair," O*ne Earth 2*, no. 5 (May 22, 2020): 417–28, https://doi.org/10.1016/j.oneear.2020.05.002.

154 A Theory of Change is a detailed description and illustration of how and why a desired change is expected to happen in a particular context. The ToC is developed by first identifying the desired long-term goals and then working backwards from these to identify all the conditions (outcomes) that must be in place (and how these related to one another causally) for the goals to occur. These are all mapped out in an Outcomes Framework often in a visual or 'flow-chart'. Adapted from https://www.theoryofchange.org/what-is-theory-of-change/ accessed on 30 March 2021.

155 Craig Valters, "Theories of Change in International Development: Communication, Learning, or Accountability?," *London School of Economics and Political Science* Justice and Security Research Programme, no. 17 (2014).

ASSESS POTENTIAL SYNERGIES WITH EXISTING PRIVATE SECTOR INVESTMENTS

The promotion of outgrowers scheme may have good potential for communities around existing private sector investments. Investing in CFEA might be more attractive to the private sector if potential CPAs are close to their current investments. That would allow the private sector to limit the risks in securing material sourcing while expanding their operations more sustainably. During the planning phase, a specific focus should be placed on identifying private partners in the landscape willing to partner with CPA members to develop CFEA.

A significant barrier to meaningful discussions with the private sector is a lack of mapping of potential areas for CFEA. Different value chains are suitable for different parts of the CML. The degradation of CPA management blocks needs to be determined to assess what CFEA are suitable. Accordingly, a mapping exercise for the CML needs to be undertaken to identify priority CPAs for different value chains.

Land-use planning is an essential part of developing CFEA. Land-use plans for PAs and CPAs are critical for determining where production should be located within a CPA and for compliance with CFEA once it is established. As in the case of the Ibis Rice model (Box 5), the whole compliance system and therefore, conservation outcomes, rely on a widely accepted land-use plan. Therefore, it is recommended that land-use plans be developed for all CPAs where CFEA are to be implemented.

Assessing the eligibility of a CPA to a given CFEA will pose some complex questions. These include:

- What level of degradation in a CPA means that part of it can be cleared for a non-native tree plantation?
- In the case of forest farming for understory crops, under which conditions can the understory be cleared, or what level of thinning can be done?
- If criteria are established for the previous questions, how can we ensure that this is not creating incentives to increase forest degradation so that partially degraded land becomes eligible for investment?

Guidelines will be needed to identify the levels of degradation in a CPA, and the different types of CFEA allowed. Activities should only be allowed if the area was already degraded for some period (e.g. 5 years, 10 years, etc.) to avoid creating incentives for further forest degradation. This approach is used by carbon finance standards like the Gold Standard, which bans reforestation projects on lands that were forested in the last 10 years.[156] Similarly, directives 01 and 06, allowing titling of lands in PAs, require the lands to have been cleared and occupied for at least 10 years.[157,158]

Zoning of CPA areas eligible for different CFEA could use a similar approach as the one developed for REDD+ projects. Future work could use new LIDAR satellite imagery to better estimate the level of forest degradation and map the potential for CFEA involving significant land preparation work. At the local level, a fine-grained mosaic approach should be implemented to keep corridors of natural ecosystems, as well as to maintain customary uses of these ecosystems. For the most disruptive business models, a conservation-friendly version of the leopard skin approach should

156 Gold Standard, "Land Use & Forests Activity Requirements - Version 1.2.1," April 2020, https://globalgoals.goldstandard.org/standards/203_V1.2.1_AR_LUF-Activity-Requirements.pdf.

157 Circular 06 "Granting State Property to Citizens and Civil Servants". https://www.phnompenhpost.com/national/minister-tells-governors-speed-land-allocation

158 Directive 01BB: Measures Reinforcing and Increasing the Efficiency of the Management of Economic Land Concessions

Box 14. Criteria for selection of CFEAs in PAs

Conservation impact

- How does the business impact the environment?
- Which actions will be used to mitigate this impact?
- Does it contribute to displacing wood demand away from natural forests?
- Does it contribute to PA financing?
- Does it support ecosystem restoration using native species?
- Does it provide incentives for the local population to switch to conservation-friendly practices?
- Does the production support a shift to sustainable consumption models on the demand-side?

Social safeguards

- Is the project undertaken with FPIC using an independent third party?
- Has a dialogue platform been created among the company, local authorities, & the local community?
- What measures has the company implemented to secure customary rights?

Jobs creation

- What is the job creation potential of the project?
- Who will benefit from the job creation?
- Will the project include local processing & packaging?
- Are the required skills available locally?
- Does the project include vocational training so locals can take up higher-skills positions?

Shared value

- Does the project support fair & transparent benefit-sharing?
- Does the project lead to improved infrastructure for the local population?
- Does the project contribute to commune development fund?
- Does the project allow local farmers to participate in intercropping, silvo-pastoralism, or NTFP collection?
- Will the project support an outgrowers scheme?

Climate change mitigation & resilience

- Does the project contribute to building resilience to future climate change?
- Does the project increase local people's resilience to climate change?
- Will the project support the shift to a low-carbon economy?

Sound business model

- Are the assumptions & expectations realistic?
- Has the business model already been applied elsewhere?
- Has the product already reached the market?
- Will the production in CPAs affect the product characteristics?
- Does the business model include costs & constraints related to work in CPAs?
- Have the investors already been identified?

be used to ensure that it does not negatively affect biodiversity. In all circumstances, the engagement of the private sector for CFEA should only be considered as a tool for local economic development and sustainable landscape management, which will be applicable in some situations only.

FREE, PRIOR, AND INFORMED CONSENT (FPIC) FOR PRIVATE SECTOR INVESTMENT IN CFEA

The PA Law (2008) requires consultations with local communities, among others, but it does not stipulate their nature. Article 11 allows the MoE to permit development and investment activities in the Sustainable Use Zone after consultation with relevant ministries and institutions, local authorities, and local communities. The history of private-sector partnerships in the landscape has significantly impacted local people and indigenous populations, which can be seen with the widely documented displacement of communities. The process of FPIC should be applied to ensure that the project does not negatively impact local communities and indigenous groups. (See Appendix 3 for the main principles of FPIC).

FPIC can support the securing of investments by reducing land encroachment by local people and new migrants. It is recommended to have an external facilitator, or NGO, steering the FPIC process to avoid blurring the line between the public sector, the community, and private interests, as can be observed in some previous ELCs.[159] The FPIC process is a lengthy and costly process, which can prevent the private sector from supporting small-scale projects. Consideration should be given to providing funding to local NGOs to help the process by providing independent awareness-raising and legal advice. The respect of the agreements by all parties should be monitored, and a grievance mechanism should be established at the commune council. The FPIC principles should continue beyond the project through regular monitoring by local authorities and social impact assessments.

BUILD STAKEHOLDERS' READINESS TO ENGAGE WITH THE PRIVATE SECTOR

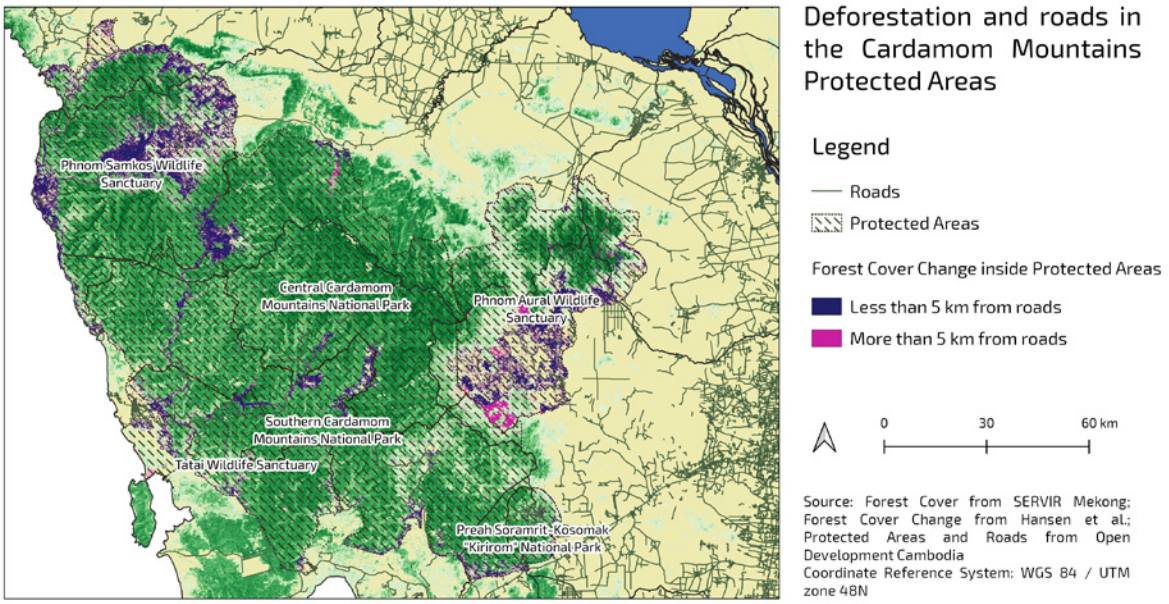
There is limited capacity to get CPAs project-ready. Currently, the MoE has limited capacity to engage potential businesses actively, structure projects, assess their economic viability and the social and environmental impacts, negotiate fair benefit-sharing agreements, and monitor project implementation. The MoE also does not have transparent procedures in place that would allow communities or the private sector to initiate this process. This could result in missed opportunities and repercussions from a lack of transparency in the decision-making process. It also increases the potential for detrimental social or environmental outcomes. The CSLEP project should support the development of clear and transparent procedures for engaging the private sector in partnerships with the MoE, CPA committees, and communes and should include guidelines for fair benefit-sharing.

Assessing private sector investment in CPAs should follow set criteria that look at multiple benefits. These should include how the investment can contribute to increased quality of life, protection of biodiversity, climate change mitigation, and building local resilience. The assessment should ensure that the investment does not negatively affect some part of the local population.

Significant capacity building is necessary to enable local communities to participate in CFEA in CPAs. Communities require substantial strengthening of technical, entrepreneurship, and governance skills to play an important role in the different business models. External support to complement the MoE's capacity would considerably help fill these critical gaps in the short run.

159 Michael B. Dwyer, Emily Polack, and Sokbunthoeun So, "'Better-Practice' Concessions?: Lessons from Cambodia's Leopard-Skin Landscape," in *Large-Scale Land Acquisitions*, ed. Christophe Gironde, Christophe Golay, and Peter Messerli, Focus on South-East Asia (Brill, 2016), 205–28, https://www.jstor.org/stable/10.1163/j.ctt1w76v19.16.

Figure 26. Impacts of roads on deforestation in the CML Protected Areas



Financial support from RGC and development partners is needed to ensure equitable power relationships between communities and companies. CPA members may require external support to ensure that they are not overly dependent on private companies and trapped into disadvantageous commercial relationships. Communities should be supported in the development of their own organizational, technical, and legal capacities and their ability to invest in their own infrastructure. An assessment of credit schemes with CFs and CPAs showed that they "can successfully apply for, execute and repay credits, provided they are supported to make foundational improvements in the areas of legal compliance, transparency, accounting systems, and overall financial administration."[160]

SYNERGIES WITH INFRASTRUCTURE DEVELOPMENT

One of the key activities financed by CSLEP is improved connectivity. This activity will increase the competitiveness of the ecotourism sites and reduce transportation costs for communities and for the transport of forest and agricultural products, thus making these areas more attractive for private sector investment. Although the project will only invest in improving existing roads, these activities might lead to higher pressure on the existing forest resources, along with the expected increase in land value. While anecdotal, the correlation between road construction and land-use change appears strong.[161] A GIS analysis (Figure 27) of the deforestation trends in Protected Areas of CML shows that 89% of the forest cover change is located less than 5 km from roads. A way to address the negative impacts of road development is to ensure that priority support for sustainable economic activities is provided to those communities in key risk zones as well as to improve law enforcement in these areas to promptly identify and address land grabbing threats.

160 James Bampton, Thomas Enters, and Ratana Pen, "Study on Effective Sustainable Forest Financing Mechanisms in Cambodia" (Phnom Penh, Cambodia: Partnership Program for Forestry and Fisheries in Cambodia (PaFF), 2021).

161 The improvement of the roads from Snoul to Mondulkiri caused "massive small-scale deforestation and increasing illegal logging in Snoul Wildlife Sanctuary". Delux Chhun, "Drivers of Forest Change in the Greater Mekong Subregion: Cambodia Country Report" (USAID Lowering Emissions in Asia's Forests, September 2015).

07

THE JOB CREATION POTENTIAL OF CONSERVATION-FRIENDLY ECONOMIC ACTIVITIES

7.1. FRAMEWORK TO ASSESS THE IMPACT OF CFEA ON JOBS

The creation of a high number of quality jobs is essential to transition from non-sustainable illegal livelihood activities to conservation-friendly economic activities. In that context, it is crucial to prioritize the CFEAs with the highest potential of quality job creation. A job is defined in this report as any income-earning activity that is not illegal.[162] In that sense, a job is a range of income-earning activities that can be carried out at different times of the year. A wage-laborer on a farm, a full-time worker for a plantation company, and someone who collects and sells NTFP are all considered job-holders. Beyond the quantification of the job potential, an assessment of the potential of CFEA to create jobs needs to look at other critical aspects, such as job quality and job accessibility.

Several indicators were used to assess the impact of CFEA on jobs (Table 1). Some jobs will be highly seasonal or during some specific phases of the business cycle and might interfere with current agricultural practices (e.g. planting trees in a plantation overlapping with rice season). Some jobs will require specific levels of skills that might not be available locally, and therefore, will not bring benefits to the local population and therefore might not achieve the expected conservation impacts. Instead, it might increase migration inside PAs. The remuneration potential will also vary from one position to another. In some cases, the impact on the local population might be limited compared to the baseline situation. Some value-chains might create more jobs than others, but these jobs could be of lower quality and will have less potential to displace non-sustainable livelihoods activities. Therefore, a good understanding of these impacts and the potential trade-offs is essential to ensure that the CFEA selected provides a net positive impact to the local population (see Table 1).

Table 1. Matrix for assessing the direct impact of CFEA on jobs

Outcome		Indicator
Job creation	Job creation	No. of wage-employed CFEA participants
		No. of Full-Time Equivalent (FTE) jobs created by the CFEA
	New enterprises	No. of newly established firms with more than one paid employee
	Self-employed	No. of self-employed CFEA participants
Job quality	Worker productivity	Ave. output per worker among CFEA participants
	Working conditions and benefits	No. of project beneficiaries covered by social security insurance
		Share of CFEA participants reporting satisfaction with their job and safe working condition
		Ave. No. of hours worked per CFEA participants per week
	Earnings/ Livelihoods	Ave. annual earnings of CFEA participants
Job access	Labor force participation	Labor force participation rate among CFEA participants
	Access and Opportunity for Jobs	Disaggregation of previous indicators by gender and/or age
		Disaggregation of previous indicators with the share of CFEA participants coming from local community for qualified and non-qualified positions

Adapted from the World Bank Job M&E Toolkit[163]

162 Wendy Cunningham and Claire Honore Hollweg, "Cambodia's Future Jobs: Leveraging Integration for Better Jobs" (Washington, DC: World Bank, n.d.).

163 "Jobs M&E Toolkit" (Washington, DC: World Bank, n.d.), https://www.jobsanddevelopment.org/toolkit/.

The promotion of CFEA could have significant positive co-benefits by developing the enabling framework for the production and marketing of other CFEA. Such co-benefits could include improving access to products and markets, supporting community organizations (e.g. developing cooperatives), generating benefits that can be reinvested, and improving human capital.

7.2. JOB CREATION POTENTIAL OF THE DIFFERENT MODELS

Potential job creation and the quality and accessibility of the jobs vary, depending on the business model. Estimates of Full-Time Equivalent (FTE) jobs per business activity at the scale of a CPA were made based on an equivalent of an annual revenue of US$2,100 per year. This analysis shows that forest farming creates more FTEs than growing vegetables in a greenhouse does, for example (Table 3). While the scale of one CPA was used for this comparison, the level of investment will vary significantly between the different models, ranging from around US$20,000 for a small-scale bamboo processing facility to approximately US$1 million for 500 ha of short-rotation tree plantation (Table 2). These figures do not include indirect and induced jobs such as transportation, mechanics, and catering.

Some CFEA can also lead to a higher rate of jobs spillover by allowing upstream or downstream value additions building on the production or its by-products. By doing this, it would significantly increase the job creation potential of this CFEA. As presented in below, if tree plantations can only create a moderate amount of jobs for a given investment, it can allow the development of a larger amount of jobs if the wood products and their residues are to be processed locally. Furthermore, most tree plantation companies will outsource many activities upstream, including land preparation, tree harvesting, and transportation, and can enable many others downstream in the processing of the wood products and wood residues. Therefore, total job creation would be much higher, even if some of these additional jobs will likely be outside of the community.

Beyond the number of jobs created, the quality of these jobs will also determine the potential of the CFEA to transition away from non-sustainable illegal livelihoods. The quality of these jobs will be very specific to the value chain implementation and the level of added value that will be made locally.

Job creation potential needs to be put into perspective with current income that can be obtained from NTFP collection. The income that NTFP can generate varies according to the local situation and the level of ecosystem degradation. For example, the average household income from NTFP for members of the Tasal CF in Kampong Speu was US$2,300 (Table 3).

Table 2. Job creation potential at the scale of a single CPA

Sector	Size	Employment benefit[164]	Initial investment (US$)
Short-rotation tree plantation	250 – 500 ha	15 – 30 FTE[165]	US$ 500,000 – US$ 1m
Sustainable charcoal production	Based on the above plantation size	15 – 30 FTE[166]	US$ 25,000 – US$ 50,000
Vegetable greenhouse	750 m2 – 1,500 m2	4 – 6 FTE[167]	US$ 20,000 – US$ 40,000
Forest farming	10 – 30 ha	15 – 45 FTE[168]	US$ 30,000 – US$ 75,000
Bamboo incense stick	250 kg – 500 kg per day	10 – 20 FTE[169]	US$ 20,000 – US$ 40,000

Table 3. Income from NTFP in Tasal Community Forest before land-use change.

Item	Quantity harvested per household	Income per Unit	Period	Quantity per year (US$)
Mushrooms	2.5 kg per day	US$ 3 per kg	3 months	$90
Bamboo	35 stems per day	US$ 1.25 per culm	3 months	$525
Orchids	15 kg per day	US$ 2.5 per kg	5 months	$163
Rubber	2.5 kg per day	Irregular		$50
Vegetables	US$ 12/h	Irregular	6 months	$20
Fence	10 /day	US$ 2.5 per fence	6 months	$1,200
Materials for Housing	1	US$ 8000	30 years	$275
			Total	$2,323

Source: UNDP[170]

The opportunity costs to households of shifting livelihood activities should be considered. The sustainability of the harvests in Tasal CF might not have been sustainable if the CF had been heavily degraded. Still, the income from NTFPs can represent a significant opportunity cost if replaced by other livelihood activities.

The importance of NTFPs is likely to be proportionally higher for marginalized groups and women. Indeed, landless people will tend to rely more on NTFP than more wealthy households will. Even degraded land can be valuable for grazing or other activities. It is essential to ensure that private-sector investment in CFEA does not lead to a net loss of income for marginalized community members. These groups are likely to be the most dependent on NTFP, and therefore, the most vulnerable to any income loss. Therefore, a special focus should be placed on the job impact of the various CFEA on the most vulnerable members of the community.

164 Defined as a daily income of US$ 7 for 300 days per year

165 Estimated based on commercial plantations operations in Cambodia and Laos – land preparation is considered as externalized to contractors.

166 Estimated based on an estimated net profit of 400 Riels per kg of charcoal produced.

167 A greenhouse of 35 m by 10 m would employ approximately 2 people for its operation.

168 Estimated profits based on 800 m2 plot pilot by Caritas Switzerland

169 Estimated by comparing business models of different size

170 "Valuation of Ecosystem Services in the Prek Tnoat Watershed (2nd Draft)" (UNDP: Phnom Penh, 2018).

Before a project is undertaken, households and communities must give free, prior, and informed consent. The figures for Tasal CF (Table 3) illustrate the importance of sound business models that take into account the opportunity costs of households and communities joining a venture. The implications of switching livelihood activities should be examined and understood by participating households and communities in the form of free, prior, and informed consent before projects are undertaken. It is only under this condition that CFEA may support reducing illegal activities (Figure 27).

7.3. RECOMMENDATIONS TO INCREASE LOCAL JOBS

PROMOTE LOCAL PROCESSING FOR HIGHER ADDED VALUE

Economic development in PAs should focus on local job creation. A major differentiation between CFEA in PAs and other development models like ELCs should be on adding value through processing to create local jobs. Enabling policy and fiscal instruments, such as reduced or canceled fees for projects with processing developed locally, could be implemented.

Local processing can significantly increase job creation and the quality of the jobs. For example, the CamAgra operation has both a plantation producing pole and industrial wood and a veneer processing factory that processes the wood into veneer. The factory not only adds value to the product but also increases the jobs created by a third. In the case of a non-mechanized production process, this ratio of extra jobs created can be even higher. For example, charcoal production using residues from a sustainably managed plantation can double the total number of jobs created (Figure 28).

Figure 27. Illegal loggers crossing a pilot Teak plantation in Tasal CPA out of Phnom Aural Wildlife Sanctuary.

Photo: *Nir Atzmon*

INCREASE CAPACITY TO DIVERSIFY CUSTOMER BASE

In the longer term, local communities must develop their capacities to provide a broader range of services to customers. To avoid capacity bottlenecks along the value chains, it is important to assess which responsibilities will remain with the community and which will be led by the company. For example, the Tatai Leu community producing essential oil (Box 12) cannot currently implement some value-adding processes, nor manage a platform to receive orders. Being able to access other customers with a processed and packaged product could significantly increase local economic development as well as mitigate the impact of COVID-19, which has caused a major drop in demand by the spa industry. NGO partner FFI is working with the communities to develop packaging at the production facility, but significant capacity development will still be required for managing suppliers and customer relationships.

Some of the high-end ecotourism sites reported difficulties sourcing safe fruit and vegetables. For example, the development of greenhouse vegetable production or organic wild meat production close to ecotourism sites could add value for local producers. This will still require some significant increases in the level of professionalism and organization for farmers and their cooperatives in order to reliably meet customer orders.

Ideally, partnerships should be non-exclusive to allow CPAs to sell to other actors and to develop their activities. Having a private-sector partner to help build capacity may mean the producer has an exclusive agreement, such as the Ibis Rice model (Box 5). Allowing a community to sell to other actors may increase community resilience by reducing its exposure to drops in demand, such as the one currently seen in the spa industry as well as those in some ecotourism sites due to COVID-19.

Improving the reliability and consistent quality offered to clients will require significant capacity building. Still, being able to provide a broader range of services across the value chain, combined with capacity building, has tremendous potential to increase the potential of job creation and to support the development of an entrepreneurial ecosystem locally.

DEVELOP E-COMMERCE TO INCREASE ACCESS TO MARKETS

China offers some compelling examples of how e-commerce can power economic development in remote rural areas. The e-commerce market in China has been growing at an incredible rate, and this market is now bigger than such markets in France, Germany, Japan, the United Kingdom, and the United States, combined.[171] The central platform is Taobao, a subsidiary of Alibaba Group, which, like eBay or AliExpress, links sellers to buyers. Urban sellers represented most of the sales at the beginning of the sector's development. Rural sellers now have an increasing share, taking advantage of lower labor and real estate costs and, in some cases, proximity to production capacities.

The "Taobao villages" are developed in clusters, generally focused on the production of similar goods. This strategy provides significant benefits with a specialized workforce, availability of a dedicated supply chain, networks of support services, and quick dissemination of innovation. This cluster model can make rural communities highly competitive on the e-commerce platform. This form of local economic growth has also led to an increase in local tax collection, supporting the improvement of public infrastructure and services.

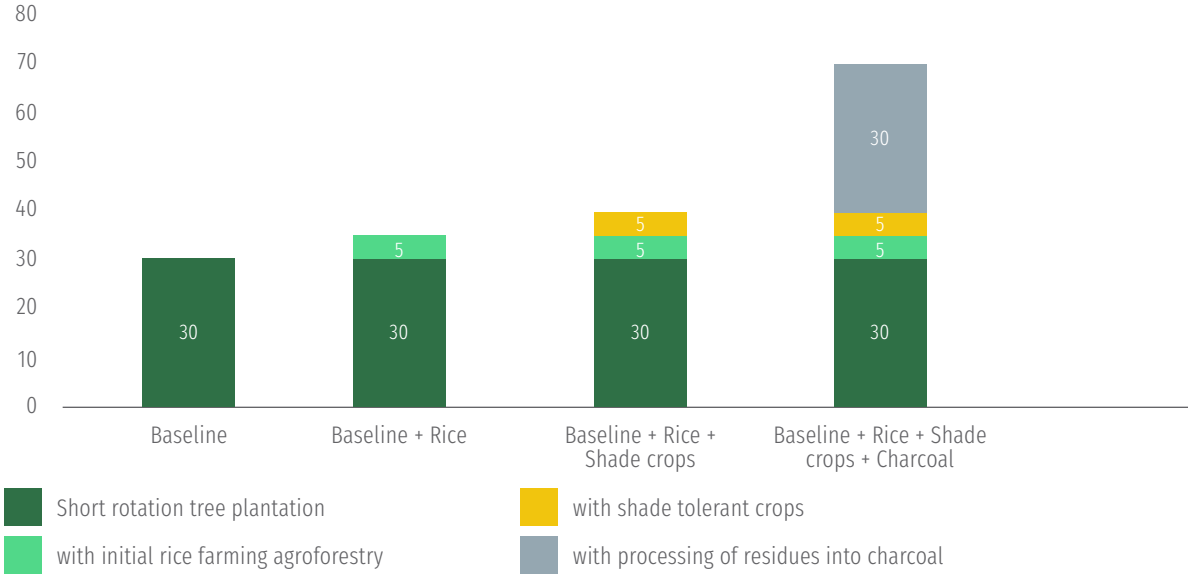
A co-benefit of e-commerce in rural areas represents a new job opportunity for the young generation. The development of e-commerce platforms creates jobs in website design, the creation of promotional materials, customer service relations, logistics, packaging, and professional services. These jobs can now be done remotely, meaning the younger generation does not have to move to cities to find quality jobs, and can instead stay in rural areas and contribute to the local economy and support their families.

The level of education, especially high-school education, was a major factor in the development of a rural e-commerce economy. In the development of e-commerce in China, young people graduating from high school were more likely to go to college. However, they often came back to the community, due to the high unemployment rate in urban areas, bringing with them laptops and skills on how to start e-commerce businesses.[172] Given that many are immigrating back to villages as a result of COVID-19, an opportunity might exist to utilize returnees in these roles.

171 "Digital China: Powering the Economy to Global Competitiveness | McKinsey," accessed July 14, 2020, https://www.mckinsey.com/featured-insights/china/digital-china-powering-the-economy-to-global-competitiveness.

172 Jiaqi Qi, Xiaoyong Zheng, and Hongdong Guo, "The Formation of Taobao Villages in China," *China Economic Review* 53 (February 1, 2019): 106–27, https://doi.org/10.1016/j.chieco.2018.08.010.

Figure 28. Comparing the number of jobs created from a medium-scale plantation (baseline) with added-value from other activities potentially associated with the plantation.



Cambodia has several of the building blocks of an e-commerce platform in place. It has a young population, very high rates of penetration for mobile phones and internet, and has many social media users.[173] Mobile money systems have also expanded very rapidly in recent years. In addition, the purchase of goods directly off social-media platforms is now common practice for a growing proportion of the population. These factors give Cambodia great potential for the replication of the "Taobao" e-commerce model.

An e-commerce model could apply in PAs for a wide range of specialized added-value products. Products from PAs, such as essential oil, handicrafts, NTFPs, and premium agriculture products (see Chapter 4) could find markets via e-commerce and could contribute to sustainable economic development in these remote areas while creating attractive jobs for the young generation.

173 Mobile penetration rate of over 100%, internet penetration of 58%, 71% of population active social media users. As a percentage of the total population. 2021 figured from: https://datareportal.com/reports/digital-2021-cambodia

08

RECOMMENDATIONS FOR DEVELOPING VALUE CHAINS AND AN ENABLING ENVIRONMENT FOR CONSERVATION-FRIENDLY ECONOMIC ACTIVITIES

The recommendations and strategic actions detailed in this section of the report are discussed in more detail in other sections. See those for further context. The recommendations have been organized into two parts, based on developing value chains for Conservation-friendly economic activities and an enabling environment for conservation-friendly economic development.

8.1. DEVELOPING VALUE CHAINS FOR CONSERVATION-FRIENDLY ECONOMIC ACTIVITIES

Recommendations for developing value chains for CFEA. A detailed list of recommendations for developing value chains generated by the analysis presented in this report is listed in Table 4. These include guidance on the planning framework needed for specific groups of value chains.

A proper planning framework is required before CFEA can be implemented successfully in PAs and CPAs. The building blocks of this framework are detailed in Section 6 of this report. These include mechanisms for establishing multi-stakeholder dialogue and for developing a Theory of Change for conservation-friendly economic development in PAs and CPAs. Extensive mapping of the CML is proposed to identify priority areas for different value chains. In these areas, it is then recommended that land-use plans be developed and guidelines created to determine what CFEA should be allowed at what levels of degradation. FPIC by an independent third-party and transparent procedures for private-sector engagement are recommended to ensure fair and equitable outcomes for local people. Criteria are proposed to assess private-sector investment in PAs, with capacity building recommended for CPAs to ensure they can meaningfully participate in CFEA. Finally, it is recommended that synergies between infrastructure for ecotourism and CFEA development be improved (Box 5). Several value chains have the potential to bring conversation-friendly economic development to the CML. These value chains are detailed briefly in the following section.

Develop value chains for Plantation Forestry (Section 4.1). It is recommended that the project replicate the benefit-sharing mechanism developed by a Cambodian teak company for similar forms of private-sector partnerships. Outgrower schemes (also referred to as contract farming) are seen as offering the potential to improve livelihoods and should be promoted in collaboration with short-rotation timber plantations. These plantations should be developed only in highly degraded parts of PAs using smallholder planting, particularly in areas where agriculture is uneconomic. To ensure that only highly degraded areas are used, and this approach does not have the perverse incentive of promoting degradation of high-conservation value areas, more detailed mapping of the CML should be undertaken to identify suitably degraded areas. It is also recommended that plantations be mixed-species, or a mosaic of single-species stands with strong soil organic matter management practices, to avoid the vulnerabilities that plantation monocultures have to climate change (Box 5).

Develop value chains for intercropping forestry with agricultural crops (Section 4.2). Short-rotation tree plantations with intercropping provide benefits to both companies and local communities, and they should be promoted in the CML. The main barrier to the expansion of such intercropping is the security of the market of the second crop, so technical support must be provided to address this issue.

Promote the switch to sustainable charcoal using plantation residues (Section 4.3). The plantations recommended to be established in degraded CPAs could make timber residues available for the sustainable production of charcoal.

Table 4. Recommendations for developing value chains for Conservation-friendly economic activities.
The recommendations and strategic actions listed in this table relate to Section 4 in the main body of the report. Please see this section for further details.

Recommendation	Strategic Action	Responsibility
Develop value chains for Plantation Forestry (Section 4.1)	Replicate the benefit-sharing mechanism developed by the Cambodia Teak company for similar forms of private-sector partnerships	MoE
	Promote outgrowers schemes (also referred to as contract farming) in collaboration with short-rotation timber plantations	MoE
	Undertake more detailed mapping of the CML to identify degraded areas for a network of CPAs for plantations with outgrowers	MoE
	Promote mixed-species/small single-species plantations to avoid the vulnerabilities that monocultures have to climate change	MoE
Develop value chains for intercropping forestry with agricultural crops (Section 4.2)	Encourage short-rotation tree plantations with intercropping for their benefits to both companies and local communities	MoE
	Provide technical support to address market security of the second crop (the main barrier to the expansion of intercropping)	MoE, MAFF
	Trial models of agroforestry collaboration with the private sector and CPA members	MoE
Promote the switch to sustainable charcoal using plantation residues (Section 4.3)	Promote the processing of timber residues for sustainable charcoal production, particularly in the Phnom Aural Wildlife Sanctuary	MoE
	Increase law enforcement around informal charcoal production to produce a level playing field for sustainable charcoal manufacturers	MoE, MAFF
Develop value chain for agarwood (Section 4.4)	Streamline the process of obtaining CITES permits between MoE and MAFF be undertaken to promote the development of this sector	MoE, MAFF
	Pilot and promote agarwood production integrated with other added-value crops in a forest farming model	MoE
Develop value chains for agroforestry with conservation-friendly agriculture (Section 4.5)	Expand multi-stakeholder collaboration (e.g. Ibis Rice model) to the export of permanent crops to international markets	MoE
	Promote outgrower farming for GAP or organic vegetables around medium-scale farms, especially near ecotourism sites	MoE, MAFF
	Support cooperatives development to partner with the private sector to access organic and high-quality GAP vegetable markets.	MoE, MAFF
	Invest in technical assistance and infrastructure such as greenhouses and cold storage for high-quality production	MoE
	Explore incentive mechanisms for farmers to maintain some biodiversity in plantations of permanent crops.	MoE, MEF, MoC
Develop value chains for livestock and chicken farming (Section 4.6)	Livestock interventions should focus on integration into the landscape through silvo-pastoralism	MoE, MAFF
	Forest farming of high-value livestock should be promoted to add value for farmers and improve ecotourism experiences	MoE
	Wildlife farming should only be considered under strict conditions that promote conservation	MoE
	Chicken farming should be promoted to increase nutritional and economic well-being and offset illegal hunting	MoE, MAFF

Recommendation	Strategic Action	Responsibility
Develop value chains for non-timber forest products (Section 4.7)	Scale-up wild honey production in the CML – particularly in areas with ecotourism – using existing models for honey production	MoE
	Promote rafter beekeeping in degraded areas along with ecosystem restoration	MoE
	Pilot and promote forest farming of high-value cash crops with valuable tree plantations in already degraded areas in the CML	MoE
	Support the expansion of the existing lemongrass essential-oil production unit to increase production and add value	MoE

This would be particularly appropriate in the Phnom Aural Wildlife Sanctuary, where most informal charcoal is made. Furthermore, vacant, degraded, marginal, or under-utilized land in CPAs could be developed to produce both charcoal and higher-added-value products. For these approaches to be viable, law enforcement around informal charcoal production must be strengthened to decrease unregulated logging. Also, the highly complex procedures to operate formal charcoal production must be eased (i.e. wood harvesting and kiln establishment permits, transportation and storage licenses, etc.)

Develop value chain for agarwood (Section 4.4). To develop value chains for protected species like agarwood, the process for obtaining CITES permits must be streamlined between the MoE and the MAFF. If this occurs, and agarwood production can be increased, it should be integrated with other added-value crops in a forest farming model (Box 4). Being a long-term investment, public and private sector support will be necessary to develop the sector in a conservation-friendly way.

Develop value chains for agroforestry and conservation-friendly agriculture (Section 4.5). The recommended approach for agroforestry is a multi-stakeholder collaboration, much like the one developed for Ibis Rice, to add value to the export of permanent crops to international markets. For the domestic market, high-quality GAP and organic vegetables are in demand, and a hybrid outgrower farming model around medium-scale farms should be promoted. This is especially beneficial in sites that are in close proximity to ecotourism sites or have good access to urban centers. Accessing these premium markets will require farmers to be organized into cooperatives to partner with the private sector. The provision of infrastructure such as greenhouses and storage facilities will help to increase the competitiveness of cooperatives. Given the importance of access to markets, the selection of ecotourism sites for increased access should also consider potential synergies to distribute high-quality GAP and organic vegetables. Permanent crops, like banana, mango, and durian have been significant drivers of land-use change, so developing incentive mechanisms to encourage farmers to maintain some biodiversity in plantations of permanent crops is recommended. For example, expanding the Ibis Rice model to other crops and commodities, or the use of tax credits, direct PES, or grants for maintaining native tree cover could be promoted (Box 5).

Develop value chains for silvo-pastoral systems and chicken farming linked to ecotourism activities (Section 4.6). Livestock interventions are a mainstay of development, and their promotion in conservation-friendly development should focus on integration into the landscape through silvo-pastoralism. Another approach that could be promoted to add value for farmers and to improve ecotourism experiences is the forest farming of high-value livestock. That said, wildlife farming should only be considered under the strict condition that it promotes conservation and reduces the risk of zoonosis. Most wildlife farming has been shown to be detrimental to conservation efforts. Chicken farming should be encouraged to increase the nutritional and economic well-being of local people and to offset the widespread illegal hunting in PAs in the CML (Box 9).

Develop value chains for NTFPs (Section 4.7). Several NTFPs have the potential to improve livelihoods in the CML with minimal impact on biodiversity. Support to wild honey value chains should be scaled up in the CML using models already developed in Cambodia and the CML. Given that tourists constitute a significant market for wild honey, this scaling should focus mainly on areas with ecotourism or reasonable access to those markets. Further added value could be achieved for wild honey production and beekeeping businesses through organized tours for ecotourists as part of an integrated business model.

Conversely, the farming of bamboo and rattan appears to have low profitability as a village enterprise under current market conditions in the landscape. The forest farming approach (i.e. managing forests to increase yields of NTFPs) should also not be applied in areas of high conservation value. In already degraded areas in the CML, forest farming of high-value cash crops, such as cardamom, could be combined with ecosystem restoration using a variety of useful tree plantations. Given Cambodia's reputation for high-quality cardamom, conservation-friendly cardamom could be cultivated in the understory of degraded forests and marketed using the distinct Cambodian 'brand'. Other crops, including turmeric, ginger, and galangal, could also be promoted for forest farming in association with high-value useful tree species. Because lemongrass essential oil is a niche product, the focus should be to expand the production of the current facility to increase value creation production rather than replicate the model.

8.2. AN ENABLING ENVIRONMENT FOR CONSERVATION-FRIENDLY ECONOMIC DEVELOPMENT

A detailed list of recommendations for an enabling environment generated by the analysis and presented in this report is listed in Table 5. These recommendations include guidance on regulatory and fiscal frameworks, improving land tenure security, building the skills and financial resources of CPA members, and creating local employment opportunities.

The current regulatory framework is far from enabling the development of CFEA. Until such an enabling regulatory framework is implemented, the logical choice for households and the private sector will remain the more destructive forms of economic development that currently dominate the CML.

CPA regulations tend to pursue conservation objectives instead of a balance of socio-economic development and environmental benefits. The rules regarding CPAs have been restrictive compared to the rights given to large-scale investors under ELCs that occur in the same Sustainable Use Zones. Currently, the ability of CPA Management Committees to engage in partnerships with the private sector is very restricted, as is their opportunity to pursue CFEA.

Private companies investing in CFEA will face greater issues than conventional businesses. To attract private sector investment in CFEA, given the challenges detailed in previous sections, the RGC should extend the fiscal incentives granted to Qualified Investment Projects to smaller investments into CFEA in PAs.

The regulatory challenges faced by CPA Management Committees are a major constraint on their involvement in CFEA. Numerous studies have reported these constraints, and they are widely recognized as major reasons preventing communities from developing profitable commercial activities based on Sustainable Forest Management.[174]

An amendment of the PA Law is necessary to create the enabling regulatory framework for CFEA and private-sector partnership agreements in CPAs (Section 5.1). The Protected Areas Law (PA Law) should be amended to grant independent legal existences to CPAs, similar to those of businesses. It should allow the opportunity and the right to contract with the private sector in order to engage in CFEA business activities if in line with forest management plans. It should also allow CPA management agreements to last from 30 to 50 years and have tenure rights with strengths similar to those of long-term leases. A revision of the PA Law should also clarify the type of CFEA activities that are eligible, orient the preparation of management plans and provide a legal basis for MoE to issue necessary authorization for the production, transport, storage, and sales/exports of sustainable products from CFEA.

The necessary amendment of the PA Law could be supported by various guidelines to support the development of CFEA. Guidelines should be developed for private-sector partnerships and contractual agreements to ensure these are fair and equitable relationships and promote sustainable production. Consultation procedures for free, prior, and informed consent should be established for private sector investments in PAs and CPAs. Given the risks inherent in development inside PAs, criteria to assess private-sector investment propositions in CPAs should be also developed.

An enabling financial framework for CFEA could further support private sector partnership agreements in CPAs (Section 5.2). Investors complying with regulations in PAs to promote sustainable production face unequal competition from actors operating in the informal market and do not follow sustainable production principles. A combination of increased law enforcement targeting illegal businesses and granting incentives (tax exemptions or other measures) for qualified sustainable businesses could be considered. To encourage more investment and to level the playing field, similar incentives as the one granted to large-scale tree plantations should be granted to CPAs and CFs with the exemption of harvesting, processing, and transportation fees for timber and NTFP. Because businesses rank unfair competition with the informal sector as their biggest barrier, fiscal incentives to formal and sustainable CFEA in PAs should be granted to support competition against the informal sector. Incentives could also be paid to the informal sector in PAs to assist them in transitioning to formal and sustainable CFEA. Furthermore, MEF could extend the exemptions for qualified investments from not only large-scale investments but also to smaller-scale partnerships with the private sector in CPAs.

Improve land tenure security for CFEA development in CPAs (Section 5.3). Confusion around land tenure is the major source of conflict in PAs. Land tenure for individuals with ongoing activities inside CPAs should be clarified while ensuring no adverse impacts on customary rights and a better understanding of impacts in conservation goals of CPAs. Completing the CPA process should be undertaken as a matter of priority, with Prakas for CPAs, management plans, zoning, and demarcation completed as soon as possible for CPAs where CFEA will be developed. To ensure progress is not lost due to land grabbing and other illegal activities, law enforcement in CPAs should be strengthened. To further empower communities, a Prakas could be developed to allow for collaborative management of Community Zones and Sustainable Use Zones.

174 James Bampton, Thomas Enters, and Ratana Pen, "Study on Effective Sustainable Forest Financing Mechanisms in Cambodia" (Phnom Penh, Cambodia: Partnership Program for Forestry and Fisheries in Cambodia (PaFF), 2021).

Build skills and financial resources of CPA members (Section 5.4). If communities are to benefit from conservation-friendly development, they need the skills to engage fully. A training needs assessment for CPAs, including skills required for engagement in CFEA, should be undertaken, followed by investment in longer-term coaching to support CPA Management Committees. Beyond skills, to increase returns for communities, grants and a loan facility should be established for investment in equipment to add value through processing. MoE and PDoEs should also further strengthen their technical capacity to actively promote private community partnerships, act as "honest brokers" between private entities and communities, and promote the interests of the public and development partners (DPs).

Create local employment opportunities (Section 7.3). To maximize benefits to CPA communities, local processing that can significantly increase job creation and job quality should be promoted. Furthermore, CPA communities should be encouraged to increase their capacities to provide better products and services to customers.

Table 5. Recommendations on an enabling environment for conservation-friendly economic development.
The recommendations and strategic actions listed in this table relate primarily to Section 8 of the main report: Barriers to enabling conservation-friendly economic development. Please see the relevant section for further details.

Recommendation	Strategic Action	Timeline	Responsibility*
Develop an enabling regulatory framework for CFEA and private-sector partnership agreements in CPAs (Section 5.1)	Develop guidelines for private-sector partnerships and contractual agreements	Short	MoE
	Develop consultation procedures for free, prior, and informed consent for private-sector investments in PAs and CPAs	Short	MoE
	Develop criteria to assess private-sector investment propositions in CPA	Short	MoE
	Amend PA Law to allow CPA committees to develop CFEA in CPAs and partner with the private sector with appropriate safeguards	Medium	MoE
	Amend PA Law to allow for collaborative management of CPAs	Medium	MoE
	Amend PA Law to increase CPA Management Plans to at least 30 years	Medium	MoE
	Streamline regulations and permit timber and NTFPs for production, transport, and sales/exports	Medium	MoE, MAFF, MoC
Develop an enabling fiscal framework for CFEA and private-sector partnership agreements in CPAs (Section 5.2)	Provide CFEA in CPA with the same fees exemptions as the large-scale plantations	Medium	MoE, MAFF
	Grant fiscal incentives to formal and sustainable CFEA in PAs to support competition against informal sector	Medium	MoE, MAFF
	Grant fiscal incentives to the informal sector in PAs to transition to sustainable CFEA	Medium	MoE, MAFF
	Extend exemptions for qualified investments to smaller-scale partnerships with the private sector in CPAs	Medium	MoE, MAFF
Improve land tenure security for CFEA development in CPAs (Section 5.3)	Clarify land tenure for individuals inside CPA, while ensuring no adverse impacts on customary rights and conservation.	Short	MoE, MLMUPC
	Complete CPA process as a matter of priority: Prakas for CPA, management plans, zoning, and demarcation	Short	MoE
	Strengthen law enforcement in CPA to reduce risks of land grabbing	Long	MoE, PDoEs

Recommendation	Strategic Action	Timeline	Responsibility*
Build skills and financial resources of CPA members (Section 5.4)	Conduct a training needs assessment for CPAs, including skills needed for engagement in CFEA	Short	MoE & DPs
	Invest in skills training and longer-term coaching to support CPA Management Committees	Long	MoE & DPs
	Support CPA Management Committee with grants and loan facility to invest in CFEA value-addition processing equipment	Long	MoE & DPs
Planning for conservation-friendly economic development (Section 6)	Establish a multi-stakeholder platform to support dialogue and a shared vision for CFEA in PAs	Short	MoE, MAFF
	Develop a Theory of Change at the landscape level for conservation-friendly economic development in PAs and CPAs	Short	MoE, MAFF
	Map the CML to identify priority CPAs for different value chains	Short	MoE
	Develop guidelines to identify the levels of degradation in a CPA that allows different types of CFEA	Short	MoE
	Develop transparent procedures for private sector engagement with MoE and CPA committees, incl. guidelines for benefit-sharing	Short	MoE
	Develop land-use plans for all CPAs, Community Zones and Sustainable Use Zones where CFEA are to be implemented	Medium	MoE
	Obtain free, prior, and informed consent using an independent third party for all private sector investments	Medium	MoE
	Assess private-sector investment in CPAs according to set criteria that look at multiple benefits	Medium	MoE
	Undertake capacity building with local communities so they can meaningfully participate in CFEA in CPAs	Medium	MoE
Create local employment opportunities (Section 7.3)	Promote local processing that can significantly increase job creation and the quality of the jobs	Medium	MoE
	Increase capacity to provide better products and services to customers	Medium	MoE
	Develop an e-commerce platform to increase access to markets for products from CFPB in CPAs	Medium	MoE

* MoE - Min. of Environment, MLMUPC - Min. of Land Management Urban Planning and Construction, MAFF - Min. of Agriculture, Forestry and Fisheries, MRD - Min. of Rural Development, DP - Development partners, PDoEs – Provincial Departments of Environment.

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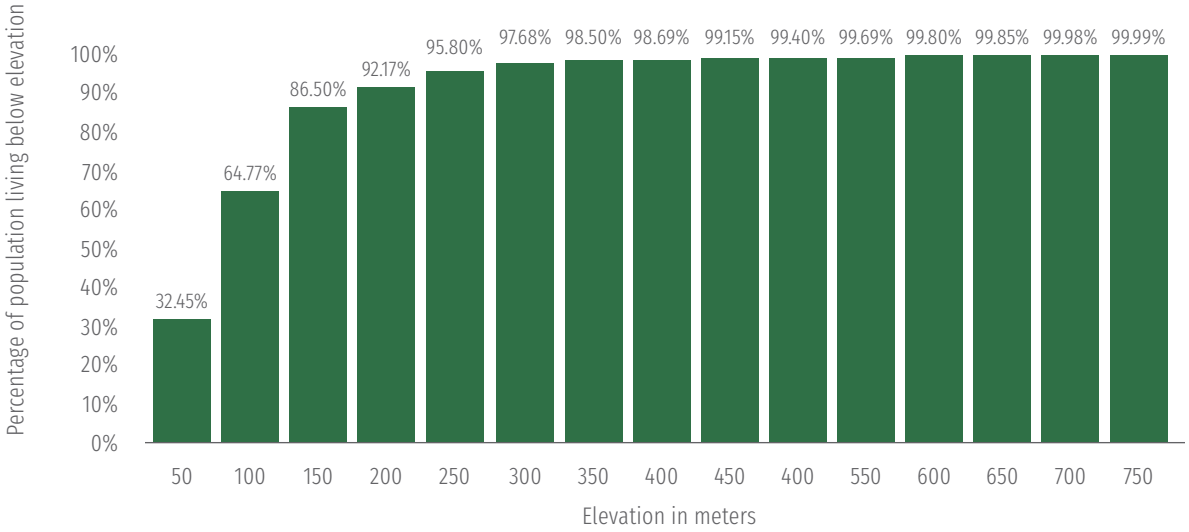
09
APPENDICES

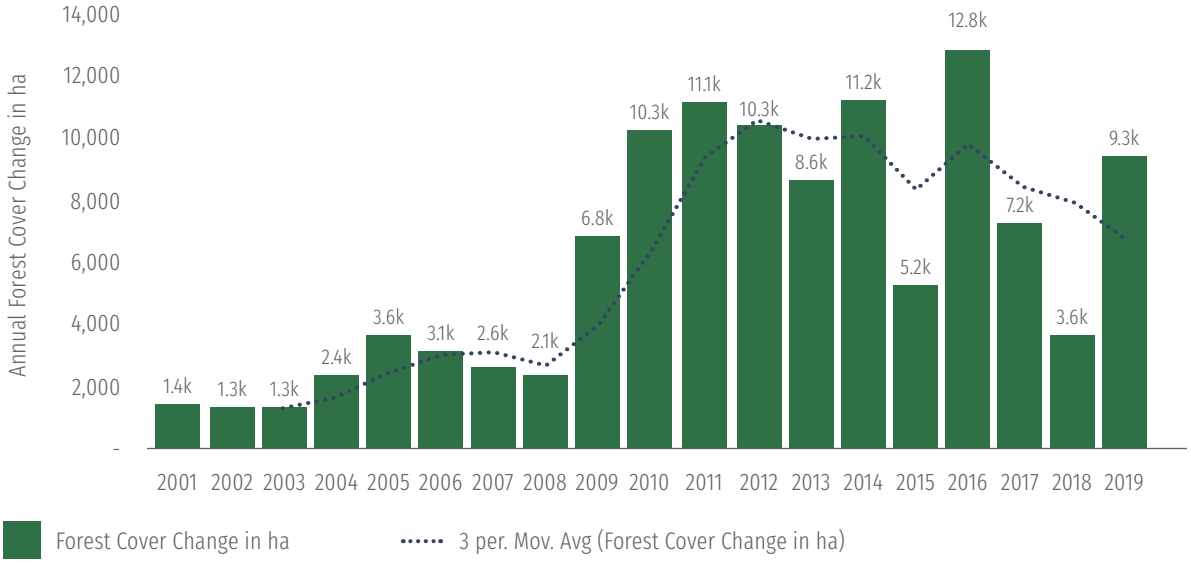
APPENDIX 1 – SUPPLEMENTARY GRAPHS

Figure A. Population distribution per elevation range in CML.



Data: *GIS analysis using population data from Facebook Connectivity Lab and Center for International Earth Science Information Network.*

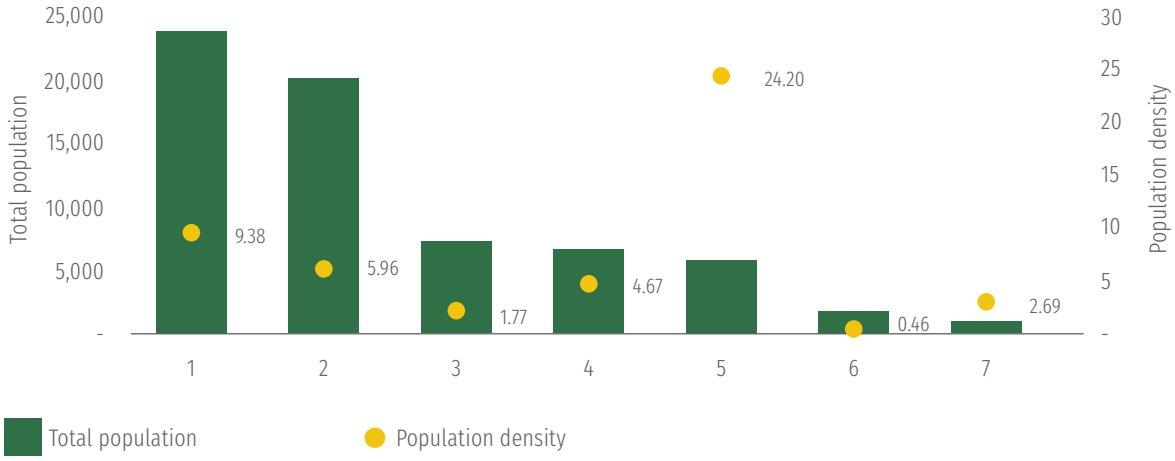
Figure B. Annual forest cover change in the CML Protected Areas between 2001-2019.



Data: *Analysis using Hansen et al. Global Maps of 21st Century Forest Cover Change*[175]

175 M. C. Hansen et al., "High-Resolution Global Maps of 21st-Century Forest Cover Change," *Science* 342, no. 6160 (November 15, 2013): 850–53, https://doi.org/10.1126/science.1244693.

Figure C. Population and density in each Protected Area of the Cardamom Mountains



APPENDIX 2 – TYPOLOGY OF NON-WOOD FOREST PRODUCTS BY FAO

	WILD → FARMED (terrestrial products)						
Product	**Wild products** Untended biological resources other than wood obtained from gathering (regardless of land-use designation).	**Non wood forest products** Goods derived from forests and other wooded land that are tangible and physical objects of biological origin other than wood.			**Agricultural products** Any product, raw or processed, marketed for human consumption or animal feed.		
	Wild products (other)	**Wild forest products**	**Semi-wild forest products**	**Managed forest products**	**Agroforestry products**	**Crop products**	**Livestock products**
Definition	Untended biological resources other than wood obtained from gathering.	Untended biological resources other than wood gathered in forests and other wooded land.	Biological resources other than wood gathered in forests and other wooded land subject to some form of human intervention to increase productivity	Biological resources other than wood gathered in managed tree production systems where primary designated land use is forest.	Products collected in agroforestry systems when crops are grown under tree cover where primary designated land use is agriculture.	Actual harvested production from the field or orchards.	Products from live and slaughtered animals.
Notes	Medicinal and aromatic plants, for instance, collected on shrub lands outside forests or other wooded land.	Wild fruit, nuts, vegetables, mushrooms, game, edible insects, honey, fodder, building/ construction materials.	e.g. acai production in Amazonia; wild tubers/yams in sub-Saharan Africa	Specifically includes the following regardless of whether from natural forests or plantations: gum arabic, rubber/ latex and resin; Christmas trees, cork, bamboo and rattan. Forest nuts and berries should also be included if from forest/other wooded land.	For example, multipurpose trees on crop lands. Land use criteria is the defining factor in this case.	Includes products collected in tree stands in agricultural production systems, such as fruit tree plantations and oil palm plantation.	*Includes honey and beeswax; honey harvested from forests/wood ed land should be included as a NWFP

From G. F. Muir et al., "Into the Wild: Disentangling Non-Wood Terms and Definitions for Improved Forest Statistics," International Forestry Review 22, no. 1 (April 2020): 101–19, https://doi.org/10.1505/146554820828671553.

APPENDIX 3 – PRINCIPLES FOR FREE, PRIOR, AND INFORMED CONSENT

FREE — There is no coercion, intimidation, or manipulation. A fundamental principle of contract law is that each party must give free and genuine consent to be bound, without undue influence, being coerced, intimidated, or manipulated.

PRIOR — Consent must be sought sufficiently in advance of any authorization or commencement of activities. There must be enough time for a genuine and robust consultation process to take place according to their own decision-making procedures.

For the granting or withholding of consent to be meaningful, it must be decided before formal decisions are made (such as by the government) about whether to allow the proposed development to go ahead.

INFORMED — Indigenous peoples should receive satisfactory and comprehensive information in relation to the project, including a preliminary assessment of its economic, social, cultural, and environmental impact. Crucially, this information should be accessible to the people concerned, and accurate.

With regard to economic development projects, all plans and proposals that provide details about the timeline, scale, location, mitigation plans and other important information, such as that provided by Environmental Impact Assessments (EIAs), must be shared with the potentially impacted indigenous community long before any decision is made to approve or not approve the project.

CONSENT — Process of which consultation and participation represent the central elements.

It requires the state, companies or local authorities to negotiate in good faith with legitimate representatives of indigenous peoples, to obtain their uncoerced prior informed consent regarding any use of their lands or resources, and to provide redress for any adverse impact on indigenous peoples as a consequence of such development.

Source: Mekong Region Land Governance.

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