Landscape Restoration Country Profile: Cambodia

Investing in Climate Change Adaptation through Agroecological Landscape Restoration: A Nature-Based Solution for Climate Resilience (Technical Assistance 6539)

October 2023

Cambodia Village. Cambodia. (photo by Roberto Serrini).

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Abbreviations

ADB	Asian Development Bank
CBD	Convention on Biological Diversity
CCCSP	Cambodia Climate Change Strategic Plan
CF	Community Forestry
CIP	Commune Investment Plan
CPA	Community Protected Area
EIA	Environmental Impact Assessment
ELC	Economic Land Concession
FA	Forestry Administration
FAO	Food and Agriculture Organization of the United Nations
FLR	Forest and Landscape Restoration
FLRM	Forest and Landscape Restoration Mechanism
FSC	Forest Stewardship Council
GDANCP	General Department for Administration, Nature Conservation and Protection
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
IUCN	International Union for Conservation of Nature
KSWS	Keo Seima Wildlife Sanctuary
MAFF	Ministry of Agriculture, Forestry and Fisheries
MoE	Ministry of Environment
MLMUPC	Ministry of Land Management, Urban Planning and Construction
NAPA	National Adaptation Program of Action for Climate Change
NBSAP	National Biodiversity Strategy and Action Plan
NDC	Nationally Determined Contribution
NFDF	National Forestry Development Fund
NFP	National Forestry Program
NGO	Non-Government Organization
NP	National Park
NPASMP	National Protected Areas Strategic Management Plan
NRM	Natural Resource Management
NTFP	Non-Timber Forest Products
NWFP	Non-Wood Forest Products
PA	Protected Area
PF	Partnership Forestry

REDD	Reducing Emissions from Deforestation and Degradation
RGC	Royal Government of Cambodia
UNDP	United Nations Development Programme
UNFCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development

Weights and Measures

%	percentage
CO_2eq	carbon dioxide equivalent
ha	hectare
km	kilometer

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Executive Summary

Cambodia is situated in the heart Indochina in Southeast Asia, with a land area of 181,035 km^2 and a population of 17 million. The highlands and mountain areas are mostly forested. The lowland areas include the Great Lake Tonle Sap plain and the Mekong River alluvial plain, where most of the population and the capital Phnom Penh are situated. Cambodia has witnessed dynamic and sustained economic growth, with agriculture being a central pillar of the economy, accounting for 50% of the labor force and 30.5% of the land.

Cambodia has relevant laws and regulations supporting landscape restoration, including institutional arrangements. In 1995, Cambodia ratified the UNFCCC and acceded to the Convention on Biological Diversity. As part of its obligations under this Convention, the country adopted its National Biodiversity Strategy and Action Plan in 2002 and had made noted progress in each of the 17 themes of the action plan. The country also acceded the Kyoto Protocol in the same year. In 2015, the Government signed the Paris agreement and presented its report on Nationally Determined Contributions.

The Land Law of 2001 introduced a new land policy, with the main objectives to strengthen the security of land tenure and land markets. The law was also expected to prevent or resolve land disputes, promote land distribution with equity, and recognize collective community land ownership for indigenous peoples.

The Forest Law of 2002 improved governance in the forest sector and established the Forestry Administration (FA) as the authority to oversee its implementation. FA is represented on five levels: central, regional inspectorates, cantonments, divisions, and districts. The primary task of the FA is to ensure the sustainable management of the permanent forest estate. This law also enables the establishment of a National Forestry Development Fund.

The 2007 Law on Water Resources Management regulates river basins' management, conservation, and development. At the national level, different aspects of watershed management are monitored and/or implemented by 14 different ministries. The institutional reforms between the Ministry of Agriculture, Forests and Fisheries and the Ministry of Environment reduced the area of production forests to an estimated 1.38 million ha, although parts of this area have protective functions and serve biodiversity conservation.

The 2008 Law on Protected Areas established a framework for the management, conservation, and development of protected areas under the General Directorate of Administration for Nature Conservation and Protection jurisdiction. It streamlines the establishment of community protected areas as participatory co-management arrangements that involve local communities in protecting biodiversity and forests. According to the International Union for Conservation of Nature (IUCN), there are 69 protected areas in Cambodia, covering 72,527 km^2 of terrestrial areas and 691 km^2 of marine and coastal areas. There has been a fast growth in protected areas in Cambodia since 2015, when the number of areas was less than 30. The National Protected Areas Strategic Management Plan 2017-2031 considers different interests and priorities in protected area management to reduce conflicts and support conservation and sustainable livelihoods.

A White Paper on Land Policy 2012 promotes environmental sustainability and prevention of land disputes. Five land categories are recognized by law: state public, state private, private, common property and indigenous land. State land accounts for 75-80% of Cambodia's total land area. Only persons or legal entities of Khmer nationality have the right to own land, but lease of land is legal for any nationality. Economic Land Concessions are controversial in Cambodia because the law and regulations on achieving and securing land concessions have not been coherently implemented and enforced. Due to population growth and pressure on both urban and rural land, land disputes have become quite common.

The National Forest Policy and Programme 2010-2029 defines Cambodia's objectives for sustainable management and conservation of the forests. It encourages multi-purpose tree plantations to be

established in watersheds to assure soil and water conservation. It defines that the participating communities have the right to sell or use forest timber for construction, and fuel wood, and non-timber forest products in balance with multiple benefits from biodiversity and environmental conservation.

The National Forest Strategy's Plan of Action for the period 2018-2032 has four Strategic Objectives and 23 proposed actions that will be implemented in three 5-year phases. Most funds will be spent on reforestation, forest rehabilitation and alternative livelihoods in forest communities.

Cambodia still has the highest forest cover in the Mekong Basin, but the highest level of deforestation. It also has the highest proportion of protected areas by national territory in the region, with 39% registered in the national protected areas system. About 80% of the remaining forest area falls within protected areas to be managed for conservation, although the system continues to suffer heavy forest losses.[1]

Cambodia initiated the Forest and Landscape Restoration Mechanism in 2016 as an integrated approach that consider multiple land uses and stakeholders with different interests. Its Work Plan 2016-2020 emphasized inter-sectoral coordination, integrated landscape governance, capacity strengthening, assessment and monitoring. Even though the forest sector is clearly male dominated, women are finding their place in forest management and decision-making. A number of laws consider gender roles in natural resource management, biodiversity conservation, and forest protection. The Ministry of Environment is implementing the second phase of its Gender Mainstreaming Action Plan.

Direct and indirect drivers of deforestation and forest degradation in Cambodia include: (i) unclear and insecure land- and forest tenure in certain areas; (ii) increased accessibility to remote forest areas; (iii) expansion of agro-industrial concessions; (iv) widespread illegal logging; and (v) unsustainable harvesting of forest products. Some of these drivers could be mitigated through improved monitoring and control, assuring that the responsible authorities and their local staff have adequate capacity, resources and commitment to manage the forest estate.

The Cambodia REDD+ Strategy 2017-2026 creates incentives to protect, better manage and wisely use the forest resources. The REDD+ readiness phase has been completed, with the development of the National REDD+ Strategy (2016) and the establishment of the National REDD+ Programme, as well as the creation of a multi-stakeholder REDD+ Consultative Group. An example that demonstrates REDD+ success in conserving high biodiversity value landscapes is the Keo Seima project, the most extensive carbon emission reduction program in Cambodia's land use sector. In addition, Cambodia has some successful forest restoration projects, some of which are summarized in the document.

Cambodia's Updated Nationally Determined Contributions (NDC) defines the target of total GHG emissions reduction by 2030 (all sectors) to be 64.6 million ton CO_2 eq/year (41.7%). To reach this goal, important elements are reducing deforestation to the half, increasing carbon sequestration in forests, and reaching a land forest cover of 60% by 2030.

Cambodia is an overall low-level contributor to climate change, but is suffering much of the consequences in the form of changing weather patterns that affect agriculture and ecosystem health, and increasing the intensity of weather-related natural disasters through flooding, landslides, droughts, and storms. The National Adaptation Programme of Action outlines priorities identified by stakeholders to address climate change resilience. The Cambodia Climate Change Strategic Plan 2014-2023 is expected to provide a policy for mitigating climate change impacts. The Plan would also improve the climate resilience of critical ecosystems, protected areas, biodiversity, and cultural heritage sites.

One of the factors for the success of reforestation, forest land rehabilitation, and natural forest regeneration in Cambodia is communal and local land and forest restoration approaches involving

[1] Chen, A., Chen, A., Varis, O. *et al.* Large net forest loss in Cambodia's Tonle Sap Lake protected areas during 1992–2019. *Ambio* (2022). https://doi.org/10.1007/s13280-022-01704-4;

decentralized institutions and local beneficiaries. Another factor is the choice of native species based on local knowledge, while considering species preferences of the local population. Another key factor that will improve the success of forest restoration program is land and forest tenure. The local communities would be willing to invest in land restoration if they have long-term security for their investments. If the communities cannot secure their long-term land and forest tenure, the risks will make it less attractive than short-term agricultural options with quicker returns.

Private sector production forestry is still a weakness. Therefore, the framework conditions for the private forest sector must be improved to develop sustainable production and exploitation of both timber and fuelwood. At the same time, efforts should be made to support forest communities in developing sustainable forest management to benefit their livelihoods and increase local income.

Restoration initiatives in Cambodia should build on international experience. A variety of ecosystem management approaches are being promoted on a global level for ecosystem repair, ranging from natural regeneration and improved management of forest plantations to active ecological restoration. Some general conclusions and lessons that could frame the land restoration and forestry development in Cambodia are:

- The Cambodia Civil Society Organizations REDD+ Network provides a platform for its members and serves as a bridge between public and private institutions.
- To develop and sustain production of timber and fuelwood, enabling conditions for the private sector investments are required, as well as enhanced efforts to unlock the potential of communities to participate and benefit from sustainable forest management.
- Certification of sustainable forest management with Forest Stewardship Council (FSC) accreditation is an efficient way to develop forest value chains and open up new markets. Cambodia's experience from Grandis Timber can function as a pilot for new forest certification initiatives in Cambodia.
- Community forestry must be based on a clear tenure to land and natural resources. Capacity building and support to communities can give the local population an improved understanding of the importance of forests for their livelihood, income generation, and their children's future. In that way, the communities would be the best guardians of the forest.
- Community micro enterprises form an important part of the private sector on local level, and should receive support from the Government for local forestry production to develop improved livelihoods.
- Communities should receive logistic, financial, and material support to have more community forestry areas approved, to rehabilitate degraded forest, and to protect good forest from exploitation.
- The promotion of multipurpose native species may not always be well-received by the communities. Field staff should not simply tell them that "native is better" but apply an approach of "the right tree in the right place for the right purpose". Another community-based opportunity is to integrate agroecological measures within specific types of farming systems, particularly in smallholder farmer regions. In forest farming, multi-purpose and high value trees should be planted in combination with agricultural cash crops and staple food sources of the communities.
- Women have a special role in community forestry due to their knowledge of multi-purpose uses of the forest species, for family use (firewood, food, medicines, etc) and products for sale. It is therefore important to assure gender mainstreaming of any local forestry project.
- An especially important area for restoration is the coastal region, due to high biodiversity on land and in the ocean and vulnerability to natural disasters. An efficient measure is planting

of mangroves that works as a protective buffer for the land, and can be combined with community-based ecosystems management and ecotourism.

- There are good opportunities for developing more protected wetland areas and Ramsar sites in the framework of integrated water resources management, including initiatives for improved wastewater treatment infrastructure and buffer zones around wetlands and reservoirs.
- Landscape restoration measures should generally be carried out within a river basin/ watershed planning approach, e.g. under the 2015 sub-decree on River Basin Planning. Watershed management is also an effective measure for disaster risk reduction. There is also an opportunity to build climate resilience of existing hard infrastructure by linking nature-based solutions and landscape restoration.
- Investments by industry participants or local smallholders into the forest resource can contribute to meeting the national goals for industry development, sustainable supply of wood products, job creation and income generation for local communities, poverty alleviation, forest rehabilitation, and environmental protection. Such investments could be facilitated through a comprehensive package of institutional and technical support mechanisms, including secure long-term land tenure. However, the forests would only be competitive compared with agriculture and other short-term investments if the government assures a level playing field without most financial incentives for agriculture.
- New technologies should be promoted for multi-tiered land use in agroforestry production systems, supporting financially viable options for the sustainable production and marketing of timber, wood fuel and non-wood forest products, providing financial and technical assistance for small business development and access to microcredit, involving local communities in ecotourism programs.
- To strengthen the Forest Administration's institutional capacity and consolidate its position, Forest Administration's mandate and resources should be strengthened as the appropriate technical authority to implement the National Production Forestry Strategy in close collaboration with other ministries and agencies. Active collaboration between line ministries and universities, national and international research institutions, NGOs, and development partners is necessary to mobilize support, scale up, and research best practices in the establishment and management of production and protection forests, and the documentation and dissemination of the results.

1 Introduction

1.1 Purpose of the Report

This report is one of the knowledge products for the Asian Development Bank's regional project "Investment in Climate Change Adaptation through Agroecological Landscape Restoration – 1. Climate Change Risk and Adaptation Option Assessment in Cambodia, Myanmar and Philippines". The report presents background information on Cambodia's landscape's situations and conservation and regeneration efforts. The report covers various topics related to forest and landscape restoration such soil, water, biodiversity, forest ecosystems, and different factors that impact the natural ecosystems including deforestation and climate change. In addition, the report reviews historical and recent initiatives from the government as well as the relationship between these initiatives.

The purpose of the report is to provide a holistic analysis with information from different thematic areas, which could be used as an overview for national and international stakeholders that would like to support landscape restoration in Cambodia. Furthermore, this report could be used as a point of reference in the dialogue among the stakeholders and provide a general baseline for community-based demonstration activities in the framework of this project.

This profile for Cambodia has the following specific objectives:

- Identify the status and trends in forest and protected areas in Cambodia;
- Review the restoration programs and their accomplishments;
- Analyze the key factors determining the success and failures of restoration; and
- Recommend improvements to the national restoration effort to apply the global standards for forest and landscape restoration (FLR).

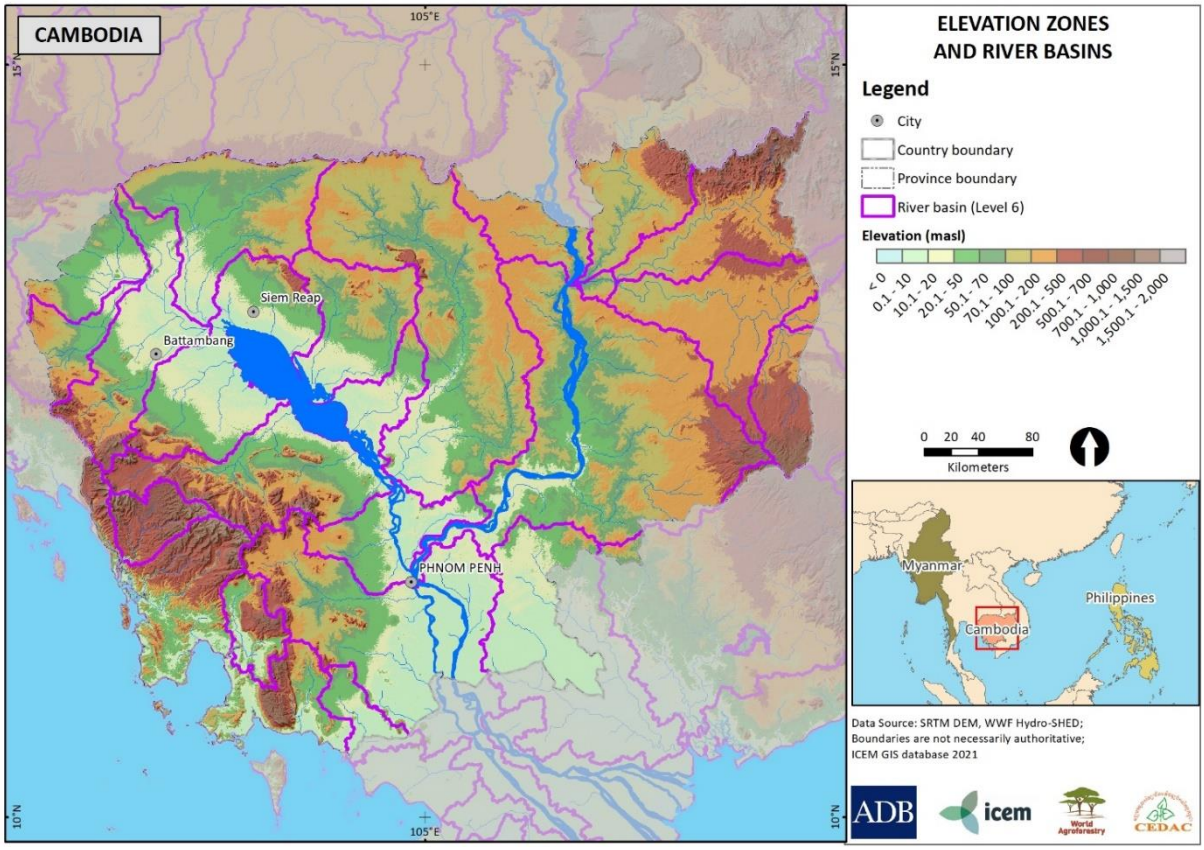
1.2 Overview of Cambodia

Cambodia is situated in Southeast Asia, bordered by Vietnam in the east, Laos in the north, Thailand in the northwest and the Gulf of Thailand in the southwest. Cambodia's land area is 181,035 km^2, with major land use including forest, agricultural, and wetland accounting for 53%, 38%, and 6%, perspectively. Topographically, the country resembles a shallow basin, with mountains on the border to Laos and Vietnam and the Cardamom Mountain chain near the coast and the border to Thailand. The highlands and mountain areas are primarily forested.[2] The lowland areas include the Tonle Sap plains and the Mekong River alluvial plain, where also the capital Phnom Penh is situated (Figure 1.1).

The population of Cambodia in 2008 was about 13.4 million in 2008, with 48.6% male (National Institute of Statistics 2009). In 2022, the population was estimated to be about 17.1 million.[3] The annual population growth rate of 1.4% is among the highest in Southeast Asia, only behind Timor-Leste 1.9% and Laos 1.5% (World Bank 2020). Until now, the Cambodian population is concentrated in lowland areas around the Tonle Sap Great Lake and the Mekong River. The urban population has increased moderately, from 2.1 million in 1998 to 4 million in 2020.[4] The majority of the population (96%) belongs to the Khmer ethnicity, while other ethnic minorities are Vietnamese (1.5%) and Cham (0.5%). The share of indigenous peoples is generally around 1-1.7% of the population, mostly established on the Northeast plateau where they practice swidden agriculture (slash-and burn).

[2] "Forest" is used in Cambodia for areas of trees with at least 5 m height on an area of at least 0.5 ha and with a canopy coverage of more than 10%. This definition is also used by the REDD+ program.
[3] https://www.worldometers.info/world-population/cambodia-population
[4] https://www.statista.com/statistics/603629/cambodia-urban-population/

Figure 1.1: Elevation Zones of Cambodia



Source: SRTM DEM, WWF Hydro SHED

Cambodia is a developing country and has witnessed dynamic and sustained growth over the past two decades. Amidst a challenging global economic environment, the annual gross domestic product (GDP) growth rate 2005-2019 was 7.1% and the GDP per capita was $1,643 in 2019. The key growth drivers – construction, tourism, and merchandise exports – together account for more than 70% of growth and 39% of the total paid employment (World Bank 2020), however these sectors were severely affected by COVID-19 and the GDP dropped significantly in 2020 (World Bank 2021). Agriculture is a central pillar of the economy representing 34.9% of the GDP in 2019 (National Institute of Statistics of Cambodia) and providing the main employment for approximately half of the national labor force.

1.3 Land Management and Social Land Concessions

The Ministry of Land Management, Urban Planning and Construction (MLMUPC) is the public agency in charge of land policy, management, land cadaster and register, survey, mapping, property valuation, and land use planning. This ministry is found on both national and provincial level. Cadastral procedures are not uniformly undertaken in all parts of the country, and professionalism and technical skills for measuring and mapping land are variable (World Bank 2002; Sokha et al. 2008). The Ministry of Agriculture, Forests and Fisheries (MAFF) and Ministry of Environment (MoE) are also involved in land administration, MAFF being responsible for agricultural development and economic land concessions (ELCs), while MoE covers environmental protection, natural resources conservation, protected areas and potential environmental impacts related to the ELCs (GTZ 2009).

The Land Law of 2001 introduced a new land policy, with the main objectives to strengthen security of land tenure and land markets. The law was also expected to prevent or resolve disputes over land and to promote land distribution with equity, thereby improve sustainability and management of the natural resources. Social land concessions should according to the Law “allow beneficiaries to build

residential constructions and/or to cultivate lands belonging to the State for their subsistence"[5]. To comply with the law, a new Land Administration was established, as well as a Land Management and Distribution Program (LAMDP), implemented by MLMUPC. In 2002, the Government presented an Interim Paper with a Land Policy Framework Strategy, which gave more details than the law, including registration and dispute resolution for land.

The 2001 Land Law recognizes the land of indigenous peoples as land with collective community ownership, including lands where residences are built, land used for traditional agriculture (cultivating land and paddy fields/chamcars), land reserved for crop shifting, graveyards, and forest lands with spiritual values recognized by administrative authorities and their neighbors. Ownership right over community's immovable properties and specific conditions of land use fall under the responsibility of customary authorities, known as Indigenous Peoples Community Committees, or the mechanism of community's decision. The regime of community collective ownership is therefore different from private ownership because some parts of all community land parcels are partially state private land whereas some others are public state land. With this special characteristic, Sub-decree No. 83 was promulgated in 2009 to establish the procedures for registration of collective indigenous communities' land.

A White Paper on Land Policy was issued by the Government in 2012, where most of the objectives from the law of 2001 were reflected – to achieve strengthened security of land tenure as well as sustainable management of land and natural resources. It also promotes environmental sustainability and the prevention of disputes over land use by providing for the transparent and equitable distribution and use of state land for public and private purposes. Later on, the Government confirmed its commitment to the policy, in the Rectangular Strategy Phase III (Royal Government of Cambodia 2013) followed by the National Strategic Development Plan for the period 2014-2018.

Five land categories are recognized by law: state public, state private, private, common property and indigenous land. State land (state public and state private) accounts for 75-80% of Cambodia's total land area. A special case is the indigenous people's territories, where the communities have collective ownership but it is still considered as state public land (RGC Land Law 2001; Thiel 2009).

The Constitution of 1993 established that only persons or legal entities of Khmer nationality have the right to own land; while foreigners may own above-ground floor units in co-owned buildings located more than 30 km from the border (Thiel 2009). Lease of land is however legal for any nationality without a limit of time established by law. There are also examples where State private land is sold, leased or given as concession to private entities. The Royal Government of Cambodia (RGC) Sub-decree No. 114 established that land under long-term lease or concession can be mortgaged (Thiel, l.c.; GTZ 2009).

The ELCs are controversial in Cambodia, because the law and regulations on how to achieve and secure land concessions have not been coherently implemented and enforced. "Some observers note that the tenure rights accompanying long-term land leases of 99 years and ELCs are comparable to the rights of a private owner. However, ELCs are subject to legal requirements, including the restriction on land uses contained in an approved land use plan and the exploitation of the land within 12 months after receiving the concession". A MAFF review of ELCs in 2009 led to "cancelation of the ELCs held by five companies that were not meeting requirements of the concessions they had been granted" (Thiel 2009; USAID 2011).

Due to population growth and pressure on both urban and rural land, land disputes have become quite common in Cambodia. These problems are partly because of inaccurate maps and land record, and most often the lack of land use plans. Land conflicts also often arise due to land expropriation where the existing occupants of the area either refuse to give up their land to the state or they are not satisfied with the compensation that are being offered.

[5] https://opendevelopmentcambodia.net/topics/social-land-concessions

1.4 Land Use Planning

The 2001 Land Law recognizes the land of indigenous peoples as land with collective community ownership, including lands where residences are built, land used for traditional agriculture (cultivating land and paddy fields/chamcars), land reserved for crop shifting, graveyards, and forest lands with spiritual values recognized by administrative authorities and their neighbors. Ownership right over community's immovable properties and specific conditions of land use fall under the responsibility of customary authorities, known as Indigenous Peoples Community Committees, or the mechanism of community's decision. The regime of community collective ownership is therefore different from private ownership because some parts of all community land parcels are partially state private land whereas some others are public state land. With this special characteristic, Sub-decree No. 83 was promulgated in 2009 to establish the procedures for registration of collective indigenous communities' land.

Trials of Participatory Land Use Planning and Commune Land Use Planning at rural community level have included efforts to introduce spatial planning in relation to delegation of land management authority to the local level. It is perceived that spatial planning is indispensable for the sustainable development, but it is still under development. The National Spatial Planning Policy 2011 shows the hierarchy of spatial planning expected to be established in Cambodia. The policy states that spatial planning of each level of administration, Land Use Master Plan and Land Use Planning should be based on the principle of decentralization of power and local administration:

- Regional/ global Supra national level: Economic Cooperation Development Plans (for example, within ASEAN and Greater Mekong Sub-region);
- Planning on national level (National Spatial Planning and Regional Spatial Planning targeting areas broader than a province); and
- Planning on sub-national level: Capital/Municipal, District/Khan, and Commune/Sangkat.

"Land use planning must involve the community. Indigenous peoples cannot be forced to leave the land which the community has been occupying and use based on collective ownership, except if it is in national interest or immediate need of the nation. This could be made possible by implementing the Regulation on Resettlements. All indigenous peoples, whether or not they are a member of a community, must receive protection against violation over their traditions".[6]

1.5 Agriculture

Agriculture is one of the four development pillars of Cambodia's economy, and the other pillars are construction and real-estate, tourism, and garment factories. In 2018, total agricultural land was 5.6 million ha (30.5% of total land area). The share of agricultural land has increased significantly from only 15% in the 1980s (World Bank 2021). Rice is the most important production and staple food, with a record production of 11 million ton in 2019 (FAO 2020), while other important crops are rubber, cassava, cashew, fruit crop, grains, tuber crops, vegetables and horticulture. Agricultural production is based on the SW monsoon that brings a wet season from May to October and a dry season from October to April. Since irrigation is not much developed, most areas have only one harvest per year and the areas cultivated during the dry season is only 1.3 million ha (23% of agricultural land).

"Agricultural production is predominantly carried out by household-scale exploitation" (MRLG 2016). FAO (2020) estimated that in 2013 approx. 85% of Cambodian households participated in agricultural activities. Other important production and food sources are fisheries/fish farming, livestock and collection of Non-Timber Forest Products (NTFP). Inundated rice-based systems are adapted to the specific agro-ecological conditions of the lowland plain that is marked by the seasonal flood from the Mekong River and recession of the flood water. Rainfed paddy rice produce 80% of total output. The scale of dry season rice is small; however, the yield of dry season rice is usually higher than rainfed

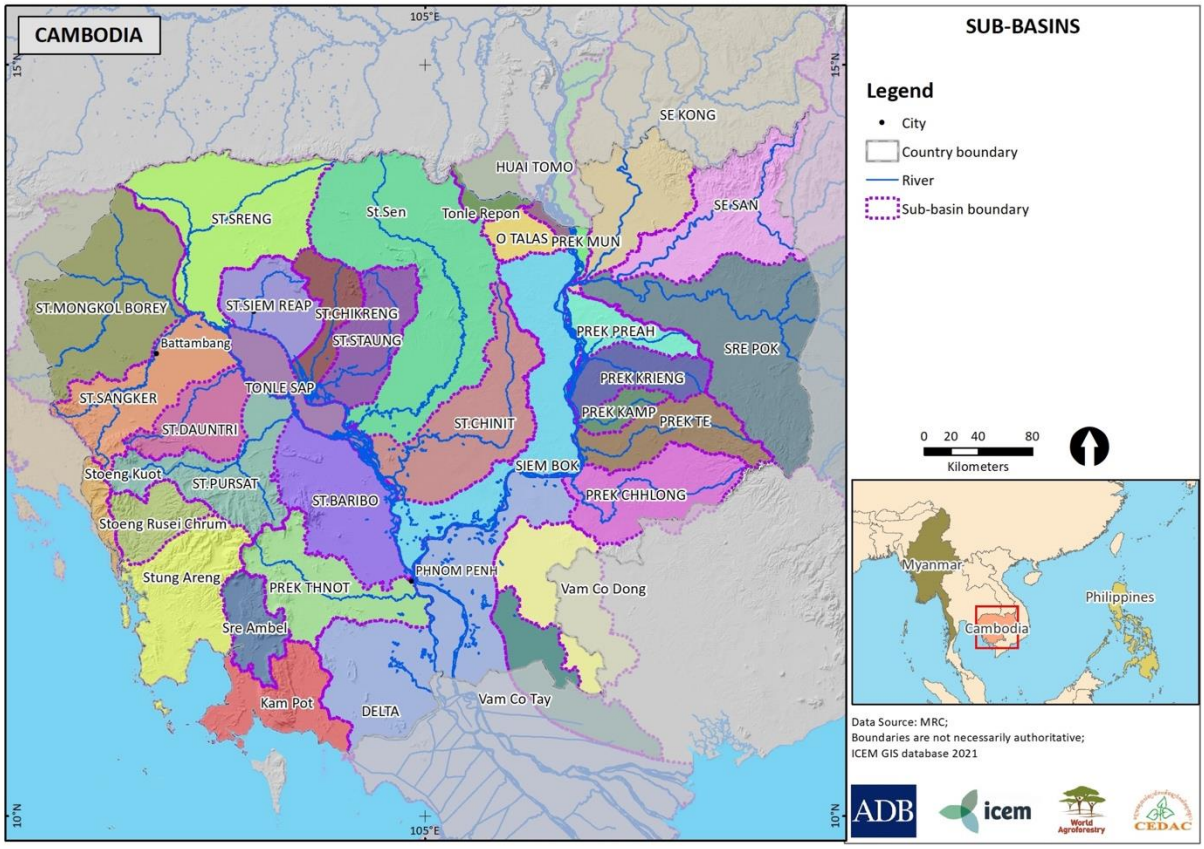
[6] https://onemapcambodia.blogspot.com/p/land-policy-white-paper.html

paddy rice due to irrigation. Most rice is consumed nationally, and the rice export for 2020 was about 1.5 million ton, or 13.6% of total production (FAO 2020). Different non-paddy rice varieties are cultivated in the dry season when the flood water recedes. Intensive multi-crop agricultural production is carried out on the banks of the main rivers, while more perennial crops and slash-and-burn agriculture are practiced on higher elevations. "Any significant agricultural expansion could cause considerable additional pressure on the remaining forest lands, as the population seeks new resources of building material, fuel and fodder" (Sachak, P., 2014).

1.6 River Basins

The 2007 Law on Water Resources Management regulates the management, conservation and development of river basins. The law was operationalized through Ministry of Water Resources and Meteorology (MOWRAM) Sub-Decree on river basin management (2015), which describes "River Basin Zoning and delineation of riparian land". Based on geographical and hydrological conditions of Cambodia, there are 7 hydrological zones and 39 river basins (watersheds) (Figure 1.2). At national level, different aspects of watershed management are monitored and/or implemented by 14 different ministries (Ministry of Interior (MOI), Ministry of Public Works and Transport (MPWT), Council of Ministers, Ministry of Economy and Finance (MEF), Ministry of Environment (MoE), Ministry of Agriculture, Forestry and Fisheries (MAFF), Ministry of Industry and Handicraft (MIH), Ministry of Mines and Energy (MME), Ministry of Rural Development (MRD), Ministry of Tourism (MOT), Ministry of Land Management, Urban Planning and Construction (MLMUPC), Ministry of Planning (MOP), Culture and Fine Arts, Ministry of Health (MOH)) and Cambodia National Mekong Committee (CNMC).

Figure 1.2: River Basins of Cambodia



Source: Mekong River Commission

2 Forests in Cambodia

2.1 Overview of Cambodian Forests

According to Lohani et al. (2020), Cambodia has the highest forest cover in the Mekong Basin, but also the highest level of deforestation, which are actually increasing. Between 2001 and 2018, nearly 2.2 million ha or 24% of tree cover was lost.[7] About 23% of all cleared forest in Cambodia between 2001 and 2015, was converted to rubber plantations. A peak period of forest clearing was between 2010 and 2013, associated with activities in logging concessions as well as agricultural expansion. At the same time, lowland forests in many protected areas were also degraded. In 2018, the total forest area with canopy density >10% was 8.5 million ha (47% of the land area) (MOE 2018 National land use/cover Statistics, Table 2.1). This cover includes natural forest and forest plantations, as well as rubber and oil palm plantations.

The Government is making significant efforts to reduce forest loss. The current area of forest designated for conservation is 4.39 million ha. Initiatives include expansion of areas under protection and establishing biodiversity conservation corridors (Figure 2.1). By 2021, Cambodia had 76 natural protected areas. About 80% of the remaining forest area falls under the protection system to be managed for conservation and 20% is for production purposes.[8] However, there are examples where deforestation has been officially approved. For instance, with the purpose to provide social land concessions for agricultural production and limestone extraction, the government dissolved the Snuol Wildlife Sanctuary in Kratie (75,000 ha) and the Roneam Daun Sam Wildlife Sanctuary in Battambang province (39,961 ha) in 2018. Since then, both of these regions had gone through a process of extensive logging.

Table 2.1: National Land Use and Forest Cover Statistics

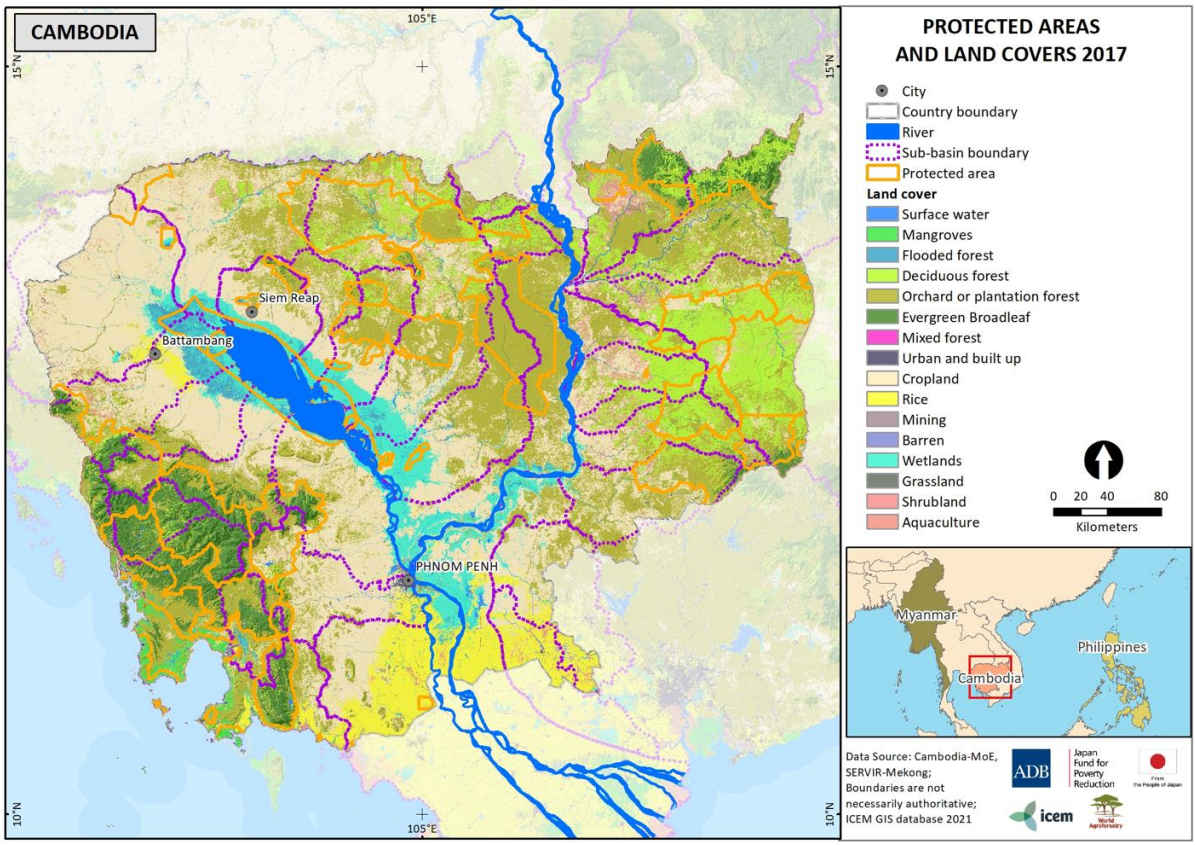
No.	Land Cover Classes	Ha (ha)	%
1	Evergreen Forest	2,799,032	15.41
2	Semi-evergreen Forest	1,038,969	5.72
3	Deciduous Forest	3,205,830	17.65
4	Flooded Forest	471,599	2.60
5	Regrowth Forest	176,088	0.97
6	Bamboo	122,397	0.67
7	Mangrove	31,298	0.17
8	Rear Mangrove	25,755	0.14
9	Pine Forest	8.186	0.05
10	Pine Plantation	3,872	0.02
11	Tree Plantation	39,254	0.22
12	Oil Palm Plantation	51,792	0.29
13	Rubber Plantation	536,735	2.96
	Total Forest Land Cover	**8,510,807**	**46.86**
14	Grassland	319,828	1.76
15	Crop Land	3,238,627	17.83
16	Paddy Field	4,286,026	23.60
17	Rock	2,341	0.01
18	Sand	41,564	0.23
19	Village	365,709	2.01

[7] https://www.globalforestwatch.org/blog/data-and-research/whats-happening-in-cambodias-forests/
[8] https://data.opendevelopmentcambodia.net/en/dataset/protectedareas

No.	Land Cover Classes	Ha (ha)	%
20	Build up Area	43,943	0.24
21	Water	758,273	4.18
22	Wood Shrub	593,556	3.27
	Total Non-Forest	**9,649,867**	**53.14**
	Grand Total	**18,160,674**	**100.00%**

Source: Ministry of Environment 2018

Figure 2.1: Land Use and Land Cover Map of Cambodia



Source: Cambodia-MoE, SERVIR-Mekong

2.2 Institutional Set-up for Forest Management

Table 2.2 presents the main institutional framework for the Cambodian forests. They are managed under a division of responsibilities with the jurisdiction of MoE and MAFF. Legal changes in 2016-17 transferred all the protected areas and Biodiversity Conservation Corridors from MAFF to MoE, while Economic Land Concessions (ELCs) that previously were under MoE were at the same time transferred to MAFF. The responsibilities for more than four million ha were at that moment transferred between the two ministries, but registration and demarcation in the field is still not complete. All PAs are still in need of management plans and only one has been divided according to the zoning stipulated in the Protected Areas Law. With an ongoing decentralization process this creates a challenging management situation.

Table 2.2: Institutions and Agencies in Charge of Forest Management in Cambodia

Institution	Corresponding Legislation	Primary Responsibilities
The Forestry Administration (FA) of MAFF	Forestry Law (2002)	Responsible for managing the Permanent Forest Estate (Permanent Forest Reserves and Private Forests) and for implementing

Institution	Corresponding Legislation	Primary Responsibilities
		the National Forest Programme (NFP), including community forestry.
MoE - General Directorate of Administration for Nature Conservation and Protection (GDANCP)	Law on Protected Areas (2008)	Responsible for management of approx. 7.5 million ha of protected areas (including the key area Tonle Sap Biosphere Reserve) and biodiversity conservation corridors.
The Fisheries Administration (FiA) of MAFF	Law of Fisheries (2006)	Responsible for flooded forest and mangrove areas. Strategic Planning Framework for Fisheries (SPF): 2010 – 2019 on Management, conservation, and development of Fisheries resources (marine and freshwater capture and culture) in PAs.
Ministry of Water Resources and Meteorology (MoWRAM)	Law on Water Resources Management of the Kingdom of Cambodia (2007)	Community ecotourism, water resource use, management, conservation, and water use association in PAs.
Ministry of Land Management, Urban Planning and Construction (MLMUPC)	Land Law (2001)	Cadastre and Geography, Construction, Land Policy, Commune Land Use Planning, Social land concession, and PA demarcation and state land registration.

2.3 Legislative and Policy Framework for Forest Management

In order to protect, conserve and prevent forest loss, the government has taken steps to respond to emerging issues and challenges in forest management. In 2002, it committed to improving governance in the forest sector through its Forest Sector Policy Statement and Law on Forestry. Those reforms were accompanied by other important strategies and legislative instruments, as set out in the table below.

Table 2.3: Legislative Framework for Forest and Landscape Restoration

Law	Key Mechanisms	Associated Sub-decrees, Strategies/plans
The Law on Forestry (2002)	Provides for the management, use, harvesting, conservation and development of all forests (planted and natural).	• Sub-degree on Community Forest (2003) • National Forest Programme 2010-2029
The Fishery Law (2006)	Is relevant for forest areas in relation to flooded forests and mangrove, as well as water bodies within the forest estate.	• Sub-degree on Community Fisheries Management (1994) • Strategic planning framework for fisheries (2010-2019) aims at management, conservation and development of fisheries resources (marine and freshwater capture and culture).
The Protected Areas Law (2008)	Protected Areas (wildlife sanctuaries, national parks, protected landscape, Tonle Sap multiple use zones), NRM dependent income generation and community carbon pooling.	• Sub-degree on Communities in Protected Areas • National Policy on Green Growth and Green Growth Strategic Plan 2013-2030 • Cambodia Climate Change Strategic Plan 2014-2023 • National Protected Areas Strategic Management Plan 2017-2031 • Gender and Climate Change Action Plan 2014-2018 • Cambodia's First National Communication to the UNFCCC 2002 and Second 2015

Law	Key Mechanisms	Associated Sub-decrees, Strategies/plans
		• Cambodia's Nationally Determined Contributions (NDC) 2017, updated 2020 • Cambodia Sustainable Development Goals, 2015-2030 • Biodiversity Conservation Corridors Sub-decree, January 2017
National Code of Environment and Natural Resources of MOE (draft April 20, 2018)	Aims to support the sustainable development of the Kingdom of Cambodia by protecting Environment and conservation, management and restoration of natural and cultural resources.	• Rectangular Strategy Phase III 2013-2018 • National Strategic Development Plan 2014-2018 • National Policy on Green Growth and Green Growth Strategic Plan 2013-2030 • Cambodia Climate Change Strategic Plan 2014-2023 • National Protected Areas Strategic Management Plan 2016-2030 • Cambodia Sustainable Development Goals, 2015-2030 • Biodiversity Conservation Corridors Sub-decree, January 2017
Land Law (2001)	Land security, land ownership rights of citizens, social economic concession, and economic land concession.	• Sub-decree on Procedure for Commune Land Use Planning (2009) • Sub-Decree No. 146 on Economic Land Concessions 2005. • Sub-Decree on Social Land Concessions (2003) • Introduction of Spatial Planning Handbook 2016.

2.4 Forestry Law (2002)

The Forestry Law NFP 2010-2029, Sub-Programme 6 (NFP 2010-2029) defines the framework for forest management, harvesting, use, development, and conservation. The objective of the law is to ensure sustainable management of the forests for their social, economic, and environmental benefits, including the conservation of biological diversity and cultural heritage (Article 1). The law prescribes areas in forestlands to be reforested. The Law also encourages citizens to plant trees and develop tree plantations. A "National Forestry Development Fund" is also mentioned to support the implementation of the operational plans, but it has not yet been formally created.

Article 45 provides that MAFF will recognize religious forests of local communities within or near the forest as Protection Forest that serve religious, cultural, or conservation purposes, and specifies that spiritual trees cannot be cut. These trees are often mentioned in the Community Forest Management Plans (CFMP) and marked in the field. Art. 45 also mentions that the areas of religious pagodas should be a target for forest plantations. The FA would identify sites for restoration; however, the task is often carried out by donor-led projects.

The forestry law does not mention the use of agroforestry, but it provides guidance for thinning activities in the forest plantations or the community forests. Under a low percent forest canopy cover or in small gaps in the forest, shade-tolerant species such as cocoa, coffee, mushrooms, rattans, and herbs can be planted. Some species, such as cocoa and coffee, can achieve a higher quality than when produced in open fields. The FA, MoE, and some NGOs apply an agroforestry model called Forest Farming in heavily degraded or open areas where the Taungya System or alley cropping can be used based on the Community Forestry (CF) guidelines.

The main provisions of the Forest Law relate to forest management, forest concessions, resource extraction, and community forestry. It is complemented by a large body of additional regulations that

strengthen the National Forest Sector Policy, where the forest sector is divided into categories, each having its own set of related laws and management priorities:

1. **Production Forests:** are managed to ensure sustainable production and include Forest Concessions and Community Forests.
2. **Protection Forests:** are protected for the value of their ecosystems and natural resources.
3. **Private Forests:** are managed under the discretion of their owners.
4. **Conversion Forestland:** is forest yet to be allocated in one of the other categories.

There are two types of forest concession systems - economic land concessions (ELCs) and forest concessions. The forest concessions are long-term leases granted through public bidding, and should not exceed 30 years. The objectives of both concession types are to bring larger forest areas under active management, reduce illegal logging, and enhance timber value. An Environmental Impact Assessment (EIA) must be carried out, and customary user rights must be guaranteed by the concessionaire.

The Forestry Administration (FA) is the authority in charge of overseeing the implementation of the Forest Law of 2002 and its subsequent sub-decrees and Prakas. FA is represented on five levels: central, regional inspectorates, cantonments, divisions, and districts. The primary task of the FA is to ensure the sustainable management of the permanent forest estate by:

- Conducting research and collecting data;
- Assessing boundaries, classify and demarcate forests in order to establish a land use map of the Permanent Forest Estate in coordination with MLMUPC, as well as the communities and local authorities (Art. 7 and 42);
- Promoting forestation on degraded forestland and idle forestland (Art. 7);
- Taking measures to prevent forest destruction;
- Promoting public education;
- Preparing and implementing the National Forest Program; and
- Conserving wildlife, especially by control of hunting.

2.5 The National Forest Sector Policy and Programme

The National Forest Policy and Programme 2010-2029 defines Cambodia's objectives for sustainable management and conservation of the forests. It encourages multi-purpose tree plantations to be established in watersheds to assure soil and water conservation. It defines that the participating communities have the right to sell or use forest timber for construction, fuel wood, NTFP, etc. The NFP also recognizes Community Forestry's role in balancing multiple benefits of forestry, including biodiversity and environmental conservation.

The policy reiterates the position of the state's ownership of the remaining national forest resources, with the goal to put them into sustainable use. The policy demands that the population and the private sector ensure forest conservation to improve food security and reduce poverty, thereby contributing to the country's socio-economic development. It targets arable lands for forestation and reemphasizes the development of forest resources. The Programme aims to maximize the forestry sector's contribution to poverty alleviation through sustainable forest management and climate-resilient forest-based livelihoods. The government has adopted a bottom-up policy by fostering multi-stakeholder consultation for the process. This includes a macro-level approach for national land-use planning with an effectively enforced legal regulatory framework.

The National Forest Strategy provides a Plan of Action for a 15-year period from 2018 to 2032. It comprises four Strategic Objectives and 23 proposed actions that will be implemented in three 5-year phases. Phase 1 (2018-2022) focuses on short-term goals. Medium and long-term goals will be pursued over the later phases. Implementation of the Action Plan is estimated to require $25.5 million in financing to cover the investment and expenses for the four Strategic Objectives. Most funds will be spent on the production of wood and non-wood forest products, particularly subsidies for

reforestation, forest rehabilitation, and alternative livelihood development for forest communities ($ 17 million). Other major expenses are the conduct of a national forest inventory ($1.75 million), identifying and demarcating boundaries of the production forest areas ($1.5 million), and strengthening the law enforcement capacity ($1 million).

"The NFP aims to increase the current level of forest cover to 60% of the total land area"[9]. It has an annual target of establishing 25,000 ha of new forest and distributing 10 million tree seedlings. However, if all the 25,000 ha should be covered with forest plantations (not natural regeneration), it would need at least 28,000 seedlings. The programme document does not clarify the sources of the other 18,000 seedlings. It will also require a strong effort from FA, MoE and other public agencies to protect and conserve existing forests. The NFP also targets 500,000 ha of high value commercial forest plantations to be established during 2010-2030 and two million ha of forest land allocated for Community Forestry. It envisions that the forest sector would be entirely self-financed.

A detailed timeline of actions is provided in three phases, assigning responsibilities and milestones for their implementation. The goals, indicators, and milestones attached to each proposed action can be measured and monitored to evaluate progress and outcomes. Relevant provisions of the NFP regarding community-based restoration highlight the need to resolve conflicting land use relating to forest concessions, Economic Land Concessions, plantations, agriculture expansion, and mining.

2.6 Community Forestry

According to the Forestry Law, Community Forests should be managed sustainably and economically, based on local Community Forest Management Plans and the guidelines on Community Forestry established by the Forestry Administration. The FA monitors the implementation of Community Forest Management Plans (Article 43) and provides technical assistance to the communities. The communities can produce seedlings for tree planting to be purchased from the communities through the national Forestry Development Fund (provided under Article 62) or from the national REDD+ programme.

Community forests were established in Cambodia since the 1990s to provide socio-economic benefits to rural communities and give them responsibilities for sustainable forest management and conservation. The Forestry Law provides for stakeholder participation, including communities, in managing and conserving production forest resources. In addition, four types of decentralized forest resource management arrangements are identified in the 20-year National Forest Programme:

1. Community forestry;
2. Community based production forestry;
3. Community conservation forestry, and
4. Partnership forestry.

Community forestry is well advanced. The 2010 strategy for sustainable forest management set a target of 2 million ha of forest to Community Forestry (CF) by 2029. As of 2018, approximately 0.5 million ha of forests were assigned to 636 CFs, and 439 CFs signed Agreements with the local Forestry Administration (FA). In addition, 85 CFs have approved Community Forestry Management Plans (CFMPs). However, supervision and technical support are strongly needed for the communities regarding sustainable forest management, logging, and value chain development. Timber harvesting is typically capital-intensive and technically complex for community-based micro-enterprises. They also struggle to compete with timber that comes to the market based on illegal logging.

The Governmental sub-decree and ministerial declarations on community forestry support implementation. Three other decentralized resource management types are piloted in some sites, but there are no governing sub-decree or ministerial declarations.

[9] https://www.irdfa.org/wp-content/uploads/2015/01/Study-on-The-Policy-and-Legislative-Framework-for-Forest-Restoration.pdf

Community forest and Community in Protected Areas mean an area of state forest or Protected Area subjected to agreements between the relevant government ministries and local communities or an organized group of people to manage and utilize the forest in a sustainable manner. Community forestry and Communities in Protected Areas are initiated and promoted mainly by the various international NGOs and donor agencies, national NGOs, civil society, and the Royal Government of Cambodia. The various laws and decrees governing Community forests include the Sub-decree on Concession Management Plans (2000), Land Law (2001), Commune Administration Law (2001), Forestry Law (2002), National Forest Policy Statement (2002), Sub-decree on Community Forestry Management (2003), and Law on Protected Areas (2008).

From a legal perspective, in a Community Forest, the state is responsible through the Forestry Administration provincial line management of the FA cantonment, FA division, and FA triage; while a Community Protected Area is managed through the General Department of Local Community of MoE. Currently, there are 174 Community Protected Areas registered under MoE.

In these areas, the emphasis is given to issues such as highly degraded forests in need of rehabilitation, use of NTFPs for livelihood improvement, increasing integrated approaches such as the community-based natural resources management (CBNRM), and benefit sharing arrangements, commercial use of timber not yet been considered.

Three other variations are being piloted, in recognition that a broadening of the existing legal framework would enable CF to be implemented in a wider variety of situations:

1. Forests classified as Protected Forest: Community Conservation Forestry (CCF);
2. Where Commune Councils wish to be more directly involved: Partnership Forestry (PF); and
3. Where large forest areas have greater commercial potential: Community-based Production Forestry (CPF).

The CFs have proven to be a very successful model for managing the forests. By merely protecting the areas, the community forests have started to recover. Funding support may be channeled to the CFs for seedlings production and tree planting. The Forestry Law supports the Cambodian tradition to carry out tree planting campaigns on Arbor Day, including in community areas, which is one of the ways the community forests increase their land cover. The FA at the sub-national level should be further trained to assist the CFs, and expanding pilot trials of the three CF modalities would be important to cover wider areas and various situations.

2.7 Promotion of Forest Plantations

During the 1980's forest plantations focused on the high-value species teak (*Tectona grandis*), and since 1985 an area of approximately 145,000 ha was reforested in this way, more than half of it planted by private companies. From 1991, the Forestry Administration established large-scale plantations within the open natural forest in target provinces, especially Takeo, Prey Veng, and Svay Veng. The species chosen mainly were those valued for wood fuel and industrial purposes (e.g., veneer), introducing exotics such as *Acacia auriculiformis*, *Acacia mangium*, *Eucalyptus camaldulensis*, *Eucalyptus urophylla*, and *Pinus* spp – all exotics. According to FAO (2012b) many of these plantations are vulnerable to forest fires if left unprotected. During the 1990s, much of the deforestation in Cambodia was focused at the interface of extensive agricultural and forest areas, particularly where soils were fertile. This was in part due to the return of people to areas they had previously lived but abandoned due to poor security during the 1980s.

The establishment of forest plantations is being promoted by MAFF/FA in open forest areas, degraded mountainous areas, and watersheds that are subject to severe soil erosion. Apart from plantations, the Forestry Administration has been encouraging and providing seedlings for non-timber forest products, such as *Cassia Siamea* for food and medicinal use, the multi-purpose *Sesbania grandiflora* and the Moringa Tree (*Moringa oleifera*) to plant along the pagodas, schools, community cultural centers, and health centers, as well as home-grown fruit trees and plantations. The re-establishment of the reforestation culture was promoted by the annual tree planting day (Abor day) on July 9th with

the participation of the King as Sovereign, senior officials, and citizens. Reforestation activities through agroforestry techniques began in Tram Kak district, Takeo province, then replicate in other community forests around the country.

The emphasis on the utilization and potential benefits of native species is reflected in the expected results of the NFP under Sub-Programme 2, which requires the commercialization of native tree species through the principle of "conservation by use" and increased planting of and rehabilitation native species. It anticipates that rare and valuable tree species populations are effectively conserved in a network of conservation stands. It emphasizes the need for increased availability of improved high-quality planting material (germplasm) to support forest rehabilitation and afforestation activities and mechanisms for benefit sharing with communities from management and seed sale. Climate change is a key consideration that calls for appropriate tree species adaptable to climatic conditions to be identified and planted.

The FA plans to establish multi-purpose tree plantations in appropriate areas in partnership with local communities, national and international NGOs, and other interested stakeholders. These plans can be achieved by enabling environment and national policy for multi-purpose plantation development through ongoing reforms to demarcate forest boundaries and secure local people's rights to plant, harvest, and market forest products and services. It aims to set up scientifically managed nurseries to ensure a stable supply of locally suitable quality seedlings for multi-purpose tree plantation activities and to identify multi-purpose tree plantation sites to be integrated within decentralized forest management plans. That would lead to FA establishing field demonstrations of multi-purpose tree plantation sites in cantonments and local communities and experimenting with the effects of growing trees in farmer fields as a means of crop diversification. Expanded extension services would be required to support local plantation activities in relation to legal and technical issues

The expected results from the use of the multipurpose species include:

- An enabling environment for local investments in multi-purpose tree plantations established through ongoing reforms to secure local people's rights to benefit from all aspects of plantation activities;
- Rural people's involvement in multi-purpose plantations is steadily increasing as a result of improved local incomes and livelihoods in participating communities;
- Watersheds are protected, and soil erosion is reduced in participating areas;
- Improved sustainable supply of timber and poles through the production of wood products at local and national levels; and
- Increase the forest cover to 60%, as stipulated in the Millennium Development Goal.

2.8 Cambodia Forest Conservation and Restoration Initiatives

2.8.1 Forest and Landscape Restoration Mechanism

The Forest and Landscape Restoration Mechanism (FLRM) Work Plan for Cambodia 2016–2018 was developed and endorsed by FA of MAFF.[10] The FLRM work plan focuses on three main outputs:

1. Creating an enabling environment for forest and landscape restoration (FLR);
2. Mobilizing resources, with action focused on public and private investment partnerships;
3. Developing pilot actions for the implementation of FLR actions in micro-catchments areas.

Cambodia initiated the FLRM in 2016 as an integrated approach that considers multiple land uses and stakeholders with different interests. It is also an inter-institutional approach that promotes interaction between organizational stakeholders covering different land use aspects. The FLRM Work Plan 2016-2020 is an updated version of the FLR Work Plan 2016-18, emphasizing inter-sectoral

[10] www.fao.org accessed Feb 2022.

coordination, integrated landscape governance, capacity strengthening, assessment, and FLR monitoring.

The main expected results of FLRM are:

- a stock-taking study of relevant legal frameworks, roles and responsibilities of institutions involved in forests and landscape management;
- improved inter-sectoral coordination and promotion of integrated landscape governance;
- assessment and identification of degraded forest landscapes and the identification of options for restoration in synergy with existing initiatives; and
- dissemination of tools for monitoring implementation of FLR in Cambodia.

The FLR activities should identify weaknesses in the governance of landscapes from integrated management and multi-stakeholder point of view, and try to resolve these issues. To be able to increase funding for FLR, the public and private sector as well as NGOs focus on the following:

- Creating an enabling environment for, and building capacity within local institutions to facilitate their access to existing financing instruments for FLR, including Green Climate Fund (GCF) and Global Environment Facility (GEF);
- Resource mobilization, including new and innovative financing mechanisms;
- Providing a comprehensive overview of existing financing instruments for FLR; and
- Facilitating multi-stakeholder dialogue and partnerships.

Representatives of public agencies, private sector, NGOs and other partners joined forces to establish the Technical Working Group on Forest Reform (TWG-FR) in May 2016. This working group has goals to facilitate dialogue, legal rights on land and forests, transparency and accountability within the existing institutional-legal framework, and presents recommendations on FLR governance.

2.8.2 Reduced Emissions from Deforestation and Degradation (REDD+)

"Reducing emissions from deforestation and forest degradation (REDD+) is a mechanism developed by Parties to the United Nations Framework Convention on Climate Change (UNFCCC). It creates a financial value for the carbon stored in forests by offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development".[11] Cambodia committed to support the development of a REDD+ mechanism at the 13th (Bali) and 15th (Copenhagen) Sessions of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC). The REDD+ readiness phase was completed with the development of the National REDD+ Strategy (2016), the establishment of the National REDD+ Programme, and the creation of a multi-stakeholder REDD+ Consultative Group. The national REDD+ Strategy 2017-2026 (Royal Govt of Cambodia 2017) creates incentives to protect, better manage and wisely use the forest resources, thus contributing to the global fight against climate change while supporting national development. The national REDD+ Strategy focuses on forest resources in general, and does not distinguish between productive and protective forests, and their particular significance for climate change adaptation and mitigation. The national land territory is the monitoring unit for the performance and possible results-based payments for reducing deforestation and forest degradation under the UNFCCC REDD+ mechanism.

According to the REDD+ Strategy, the institutional framework for REDD+ will enable Cambodia to report its GHG emissions from the Land Use, Land-Use Change and Forestry (LULUCF) sector and provide a technical annex to Biennial update report (BUR). Cambodia thereby expects to get access to results-based payments through the UNFCCC REDD+ mechanism. However, even before Cambodia was "REDD ready", the country was able to sell carbon credits, with more than $11 million in such credits from Cambodian forests since 2016. So far, the country has sold carbon credits based on the Prey Lang forest, Phnom Kravanh, the Koh Kong's Tatai area close to Thailand, and most of all the Keo

[11] https://www.unredd.net/about/what-is-redd-plus.html

Seima Wildlife Sanctuary (KSWS) in Mondulkiri province. In 2016, Walt Disney Company bought carbon credits for $2.6 million in KSWS, making it the largest carbon credit sale in Cambodian history. The deal, which was only set to last until 2021, protected 165 ha of forest land.

The Keo Seima project is the largest carbon emission reduction program in Cambodia's land use sector and play a critical role in demonstrating REDD+ success in conserving high biodiversity value landscapes. The project protects one of the largest remaining primary forests in the country and provides habitats for Asia's most threatened species including the rare Asian Elephant, Gibbons, and the Giant Ibis. KSWS protects 167,000 ha of dense forest and a 297,000-ha buffer zone. This is estimated to avoid 17.4 million tonnes of CO_2-eq emissions over 10 years. Wildlife Conservation Society (WCS) has accumulated many lessons learned from KSWS that could strengthen the national REDD+ Program.[12]

2.9 Forest Management Funds

2.9.1 National Forestry Development Fund

The Law on Forestry 2002 establishes the legal framework for the management, harvesting, use, development and conservation of the forests in Cambodia. This law enables the establishment of a National Forestry Development Fund (NFDF), which is to be administered and managed under the responsibility of the National Forestry Development Committee (the organization and function of which is to be set out in Sub-Decree), and co-chaired by the Minister of MAFF and Minister of the Ministry of Economy and Finance (MEF). The Forestry Law specifies that NFDF's revenue sources will include government allocations, premiums on forest products/by-products, wildlife conservation feeds, contributions from international organizations, donations from individuals and non-government organizations, and revenue from "other services in the forestry sector". The resources provided by NFDF can cover activities such as reforestation and forest rehabilitation, biodiversity conservation, forest extension, training, research, and development of community forestry. It is decided that the revenue of the fund must not be used for the organization and functioning of the Forestry Administration (FA). The FA is currently preparing a Sub-Decree to operationalize the NFDF.

2.9.2 A Potential REDD+ Fund

Cambodia does not have an overarching law that regulates the establishment of funds. The Cambodia Climate Change Alliance Trust Fund is the largest trust fund covering nature conservation, the other funds include the Tropical Forest Conservation and Venture Trust Fund and the Marine Conservation Trust Fund. Two other national funds with different objectives are the National Social Security Fund (NSSF) and the Commune/Sangkat Fund (CS Fund), both with a key role played by the Ministry of Economy and Finance (MEF). The experience with these funds means that the Government knows how to maintain high levels of control of financial management and decision-making processes surrounding for allocation of funds. Any National REDD+ Fund to be established under Cambodian law is likely to require oversight by MEF.

The NSSF has multi-stakeholder participation in its governance arrangements (key interest to international donors). The CS Fund uses a performance-based approach to determining revenue allocations. The United Nations Development Programme (UNDP) managed Cambodia Climate Change Alliance (CCCA) Trust Fund, which is a multi-stakeholder trust fund, offers an alternative to a government administered fund established by law. It provides evidence of donor willingness to contribute to multi-stakeholder governed funds and willingness to pool resources around overarching goals. The experience with those funds provides useful insights regarding revenue sources, particularly the pooling of domestic and international funds, as successfully demonstrated by the CS Fund.

For funding of REDD+, under UNFCCC, the REDD+ mechanism uses the whole national territory to monitor performance and results-based international payments. Cambodia has an Action and

[12] https://seimaredd.wcs

Investment Plan to implement the REDD+ Strategy (REDD+ Task Force Secretariat 2020). For a National REDD+ Fund to be established under the Cambodian legal system, it must have legal authority for its creation in a specific law. An alternative could be a project-based, donor-managed trust fund established under contractual arrangements with development partners.

"The Law on Forestry 2002, Law on Protected Areas 2008, and Law on Environmental Protection and Natural Resource Management 1996 all offer legal avenues that potentially could be utilized for establishing the national mechanism for REDD+ funding. However, all three laws would likely require amendments to be used for REDD+"[13], which might create significant complications and delay the process. Some alternatives have been suggested, such as standalone law for a REDD+ trust fund, or a multi-donor trust fund for project development. If the Government administers the REDD+ fund, other laws are relevant, such as public financial management.

[13] https://cambodia-redd.org/wp-content/uploads/2014/07/Options-for-Fund-Management-Mechanisms-for-the-Seima-Protection-Forest-REDD+-Project1.pdf

3 Protected Areas and Biodiversity Corridors

3.1 The Law on Protected Areas

The Law on Protected Areas (2008) is a key tool for forest management and biodiversity conservation. The law provides the basis for establishing community protected areas (CPA). They are participatory co-management arrangements that involve local communities in protecting biodiversity and forests, such as wildlife sanctuaries and national parks in the Pursat and Battambang provinces. For example, in 2018 following a transfer of community forest land administration from MAFF to MoE, nine community forests (CF) in Srepok Wildlife Sanctuary (SWS), were converted into community protected areas (CPA). The objective remains the same, to guarantee the exclusive right of local communities to sustainable management and use of the natural resources, as long as they also assure protection of the areas against illegal use and exploitation.

NGOs active in biodiversity conservation have expressed their concern over the need for legal tools to support CPA implementation. A Governmental sub-decree and ministerial declaration which address those concerns are pending official approval.

The PA Law established a framework for the management, conservation, and development of protected areas under the General Directorate of Administration for Nature Conservation and Protection (GDANCP), which is under MoE. It requires the establishment of a National Protected Area Strategic Management Plan, action plans and technical guidelines for managing protected areas, and proposals for establishing and modifying any protected area. This Law also enabled the establishment of a Fund for Protected Areas, the same way as the Forestry Law enables the establishment of the NFDF. The Protected Areas Fund will be managed under a committee with the Minister of Environment and Minister of Economy as the co-chairs.

The PA Fund is not yet operative, but is expected to finance protection, conservation, rehabilitation of protected areas, as well as strengthening their ecosystems and biodiversity. Some of the areas to be funded are research and education, eco-tourism, institutional capacity building, staff training, support for community protected areas, and PA infrastructure.

3.2 The Protected Areas System

According to the IUCN World Database on Protected Areas[14], there are currently 69 protected areas in Cambodia, covering 72,527 km2 (39.7%) terrestrial areas and 691 km^2 (1.4%) marine and coastal areas (Figure 3.1). 25 of these areas have gone through management effectiveness evaluations. There has been a fast growth in protected areas in Cambodia since 2015, when the number of areas was less than 30.

Table 3.1: Protected Areas in Cambodia

Type of protected area	Number
National designations	
National Park	13
Protected Landscape	14
Wildlife Sanctuary	20
Multiple Use Area	11
Biodiversity Corridor	3
National Heritage Park	2
Sub total	*63*

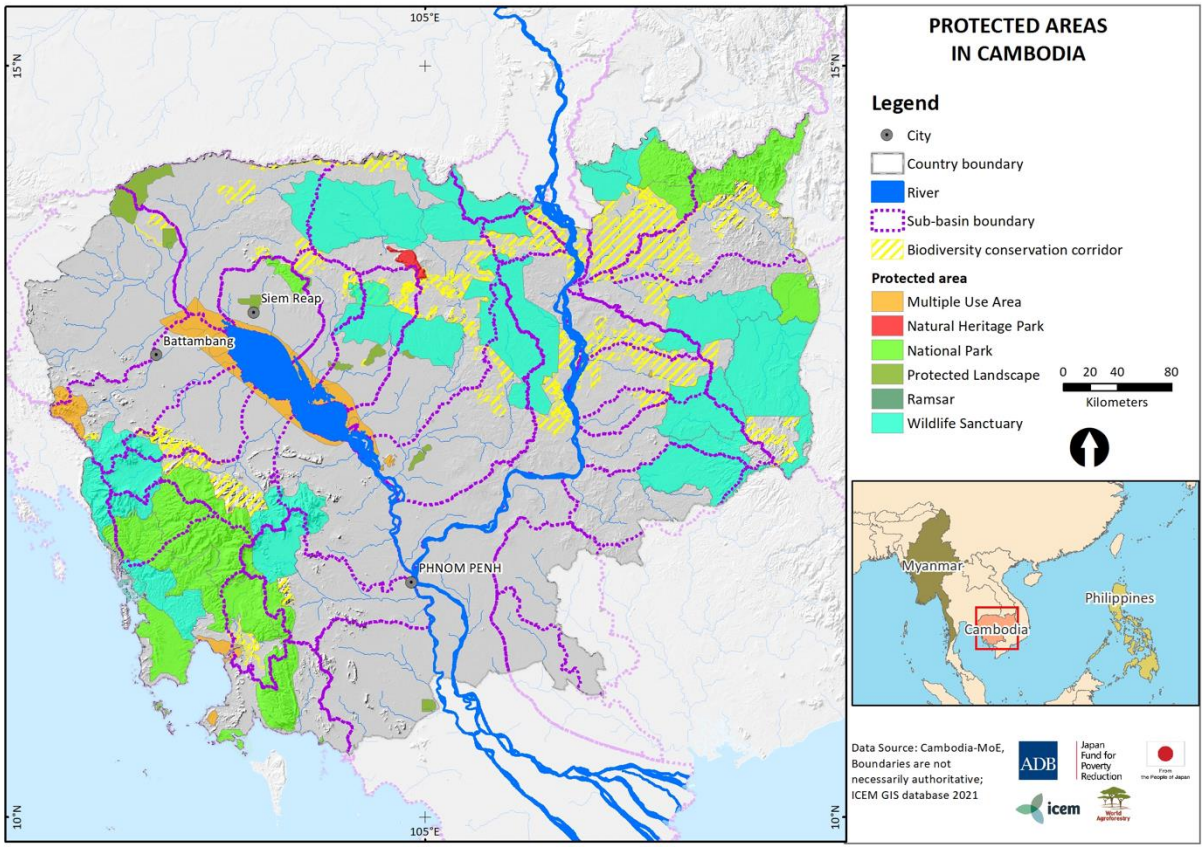
[14]www.protectedplanet.net

Type of protected area	Number
International designations	
UNESCO-MAB Biosphere Reserve	1
RAMSAR sites	5
Sub total	*6*
Total	**69**

Source: IUCN World Database on Protected Areas

MoE indicated in 2017 that the protected areas under the authority of GDANCP and the General Directorate for Local Community (GDLC) covered 7.4 million ha (41%) of the Cambodian land area, including 2% biodiversity corridors, corresponding with 27 protected areas.[15] Additional protected areas are managed by MAFF through FA and the Fishery Administration (FiA).

Figure 3.1: Cambodia's Protected Area System



Source: Cambodia-MoE

The PA law introduced three new categories of protected areas, bringing the total to eight:

1. National park;
2. Wildlife sanctuary – wildlife preservation and protection;
3. Protected landscape – protected scenic view areas to be maintained as scenic spots for leisure and tourism;
4. Multi-purpose use management area – accessible for economic development and leisure activities with the assurance of natural stability of water, forestry, wildlife and fishery resources;

[15] Cambodia National Protected Area Strategic Management Plan (NPASMP), 2017

5. Biosphere reserve – for biodiversity conservation and support of sustainable development (example the reserve Tonle Sap which is a special entity close to Battambang and Kampong Thom provinces);
6. Natural heritage site – natural or semi-natural sites unique in ecosystem, beauty or cultural value;
7. Marine park – coastal areas with plants, wildlife, and fish, with historical or cultural value; and
8. Ramsar site – areas recognized for the importance of their wetlands and surrounding environment, including wildlife, habitats and ecosystems (it is estimated that 30% of Cambodia's surface could be considered wetland and brought under the Ramsar convention).

Article 11 of the Protected Areas Law (2008) defines four management zones of protected areas:

- **Core zone**: Areas of high conservation value containing threatened and critically endangered species and fragile ecosystems. Access is prohibited except for Conservation and Protection Administration (NCPA) Officials and researchers;
- **Conservation zone**: Areas of high conservation value (natural resources, ecosystems, watershed areas, natural landscapes) adjacent to the core zone. Access is allowed only with the prior consent of the NCPA;
- **Sustainable use zone**: Areas of high economic value for national economic development and management, as well as conservation of the protected area itself. In this zone, infrastructure is permitted, however, under restrictions and with authorization from MoE; and
- **Community zone**: Areas reserved for socio-economic development of local communities and indigenous peoples. May contain residential lands and agriculture, but land titling requires a permit from MoE.

The PA law recognizes and secures access to traditional uses, local customs, beliefs, and religions of local communities and indigenous ethnic minority groups residing within and adjacent to the protected areas. An agreement for Community Protected Area (CPA) can be established between GDANCP and a community for a 15-year period (renewable). The process and procedures for establishing a CPA are defined in guidelines approved in 2017 by the Minister. There are 174 CPAs registered and 9 are in the registration process (March 2021), covering all types of land-based ecosystems, including community fish refugees.[16] In 2017, the Minister of Environment signed a guideline for establishing the Community Natural Resource Conservation Alliance as a mechanism to improve the protection and conservation of natural resources and biodiversity and enhance cooperation and effectiveness between community protected areas and relevant stakeholders.

Even though there is no national legislation for establishing private protected areas, BirdLife International has engaged with a concession system that involves the private sector in the Siem Pang Forest. Conservation International is considering a similar strategy for the Prey Long Area and the Cardamom Mountains (Fabiano & Ahmed, 2019).

3.3 Cambodia's Initiatives for Protection of Biodiversity

3.3.1 National Protected Areas Strategic Plan

The National Protected Areas Strategic Management Plan (NPASMP) 2017-2031 considers different interests and priorities in developing protected area management approaches to reduce conflicts, and supports both conservation and sustainable livelihoods. The NPASMP has mainstreamed gender into every aspect of its implementation at local, regional, and national levels. Gender mainstreaming in NPASMP entails incorporating strategies and actions to empower women and the most vulnerable groups to participate in planning, management, and decision-making processes related to protected areas. They share the benefits from the provision of livelihood opportunities equitably. Gender mainstreaming strategies and actions include:

[16] Joffre, O., Kosal, M., Kura, Y., Sereywath, P., & Thuok, N. 2012. Community fish refugees in Cambodia – Lessons Learned. The Worldfish Center, Cambodia

- Incorporating gender perspectives in the training and capacity building of protected area staff;
- Incorporating gender perspectives in the development of awareness and educational materials to reach a larger population (by not excluding women and young people);
- Assessing and considering the needs of women in establishing appropriate criteria for zoning and management planning of protected areas (e.g.; access to water and firewood);
- Developing livelihood opportunities that recognize the capabilities and strengths of women (e.g.; micro-credit schemes, community-based tourism enterprises, NTFP handicrafts);
- Ensuring part of revenues from ecosystem services (e.g.; carbon fixing) earmarked for promoting equity in beneficiary communities; and
- Establishing gender equity criteria and targets for monitoring progress in implementing the NPASMP.

3.3.2 Convention on Biological Diversity and National Biodiversity Strategy and Action Plan

Cambodia acceded to the Convention on Biological Diversity (CBD) in 1995. As part of its obligations under this Convention, the country adopted its National Biodiversity Strategy and Action Plan (NBSAP) in 2002. In 2016, Cambodia had notable progress in each of the 17 themes of NBSAP, under which 81 strategic objectives and associated indicators and 98 priority actions were identified. Nevertheless, the overall impact of the NBSAP had been limited by inadequate human, financial and institutional capacities. Those limitations included insufficient knowledge and awareness of the value of biodiversity, and inadequate integration of biodiversity into policies and programmes dealing with sustainable development and poverty reduction.

A new and updated NBSAP was approved in 2016, defining the country's biodiversity targets for 2015-2020. That NBSAP promotes reforestation and rehabilitation of degraded forest areas in all provinces. The NBSAP requires zoning for the sustainable uses of the protected areas for tourism and recreation. The NBSAP aims to develop national and provincial land use master plans that fully account for environmental considerations in the socio-economic planning process and identify alternatives and priorities (Theme 11). The areas targeted for restoration are:

- National botanical gardens and buffer zones of the protected areas (Theme 1). The natural botanical gardens can serve as in-situ and ex-situ conservation sites;
- Mining areas (Theme 8);
- Natural and cultural sites (Theme 9);
- River banks, lake shores, and riparian areas (Theme 12); and
- All degraded sites (Theme 5).

The communes and concerned agencies (FA, MoE, MIME and MoT) are required to indicate areas ideal for conservation actions and forest development, including restoration, rehabilitation, and reforestation in their land use plans.

The NBSAP aims to facilitate the cooperation, and collaboration among different Ministries and their Departments, various stakeholders within and across economic sectors, and organizations at the national, regional, and international levels. It consists of 20 targets defined by the Inter-ministerial Technical Working Group (Box 3.1) and 498 key actions to achieve 78 strategic objectives under 24 themes. Specific actions and indicators of progress towards the achievement of each target are listed in the document. Many of the actions have been adopted as part of strategies and plans for sustainable development. In addition, linkages between targets are highlighted.

Box 3.1: Cambodia's Biodiversity Targets for 2015-2020 as Defined in National Biodiversity Strategy and Action Plan

1. Every Cambodian is conscious about the environmental, economic, health, social and cultural value of the services derived from ecosystems, and integrates this knowledge in the way they deal with these ecosystems and resources.

2. The national budget allocation for biodiversity conservation and sustainable use (including NBSAP implementation) has increased by 20% through the development and implementation of a resource mobilization strategy.
3. Biodiversity values have been integrated into national and sub-national development and poverty reduction strategies and planning processes.
4. Freshwater fisheries and aquaculture are managed sustainably by addressing their constraints, and by reducing and preventing their possible negative impact on fish stocks and on aquatic threatened species and vulnerable ecosystems.
5. The majority of areas under agriculture, animal production, aquaculture and forestry are managed sustainably.
6. 10% of the protected areas, conservation areas, agroecosystems and forest ecosystems including mangroves, that have been under a lot of pressures in recent years are in an advanced state of restoration and are providing enhanced services, particularly to women, elders and children in local communities and indigenous ethnic minority groups.
7. The Government, the private sector and other stakeholders have taken steps to reduce the negative impacts on ecosystems and their services caused by unsustainable production and consumption activities.
8. (Aichi Target 11): Existing protected areas and conservation areas, including community-based natural resource management areas, have management plans and have started effective implementation (and by 2029, protected forest covers 3 million ha, in line with the objectives of the National Forest Programme 2010-2029).
9. Payment for Ecosystem Services (PES) is used throughout the country as an incentive for the conservation and sustainable use of biodiversity.
10. All species of fauna and flora threatened at the national level have been identified and their status has been improved significantly as a result of applying measures to address their respective threats.
11. Ecosystem resilience and the contribution of biodiversity to carbon stocks have been enhanced through the conservation and restoration of degraded ecosystems, focusing in particular on degraded forests, protected areas and conservation areas, thereby contributing to climate change mitigation and adaptation and to combating desertification.
12. The rate of loss of natural forests, coral reefs and other natural habitats is at least halved; and habitat degradation and fragmentation, pollution, overharvesting, introduction of invasive alien species and their impacts are significantly reduced.
13. Cambodia has designated a national focal point and one or more competent national authorities for the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (ABS), and established a functional ABS Clearing-House as part of the clearing-house mechanism; Cambodia has developed and is enforcing a legislation and national policies on access to genetic resources and the fair and equitable sharing of benefits arising from their utilization.
14. The National Biodiversity Strategy and Action Plan (NBSAP) have been updated and adopted, and have commenced to be implemented effectively.
15. Anthropogenic pressures (pollution, exploitation, sedimentation…) on coral reefs and vulnerable ecosystems impacted by climate change have been significantly reduced.
16. Pollutant pressures on terrestrial and aquatic ecosystems are substantially reduced to levels that are not detrimental to ecosystem function and biodiversity
17. The traditional knowledge, innovations and practices of indigenous ethnic minorities and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources.
18. Major invasive alien species (IAS) and their pathways have been identified and prioritized, and prioritized IAS and pathways are controlled.
19. An interoperable and user-friendly information system containing data and information on biodiversity (including its associated ecosystem services) values, functions, status and trends, and threats, and the

consequences of its loss has been established and maintained in the responsible institutions for wide sharing among stakeholders.

20. The genetic diversity of cultivated plants and farmed and domesticated animals, as well as the genetic diversity of their wild relatives is protected and conserved in-situ and ex-situ.

3.4 Environmental Protection and Natural Resource Management Law (1996)

The Environmental Protection and Natural Resource Management law establishes the basic provision for environmental protection and preservation of natural resources in Cambodia, including provisions on the requirement for EIA, and calls for the development of a National Environmental Plan. The law has multiple aims that include proposed projects to "ensure the rational and sustainable preservation, development, management and use of the natural resources" and to promote public participation in environmental protection and natural resource management. It focuses on:

- development of national and regional environmental plans (Chapter II);
- encouragement of public participation (Chapter VII);
- sustainable natural resource management (Chapter IV) including "forests and forest sub-products" (Art. 8); and
- an 'Environment Endowment Fund' applicable to environmental protection projects (Art. 19).

The 'Environment Endowment Fund' was converted into Sub-Decree on the Establishment of Environmental and Social Funds, approved in 2016 by the Minister of Environment and the Minister of Finance and Economy. The fund has provided financing for conservation projects, based on annual open callings for funding through public announcements.

3.5 Cambodia's Green Growth Roadmap

The Green Growth Roadmap aims to achieve economic growth efficiently with less resources and waste; to prevent environmental pollution; and to preserve waterways and the natural heritage. Objective 2 of the roadmap promotes restoration in the country through incentive-based payments. It aims to develop innovative investments to be carried out through:

- Payment for Ecosystem Services;
- Green Tax and Budget Reform; and
- Debt-Swap schemes with international investors.

The roadmap also includes land rehabilitation through soil conservation and reforestation, while conserving existing ecosystems including forests and other vegetation cover.

4 Climate Change and Forest Management

4.1 Climate Change and Deforestation Lead to Natural Disasters

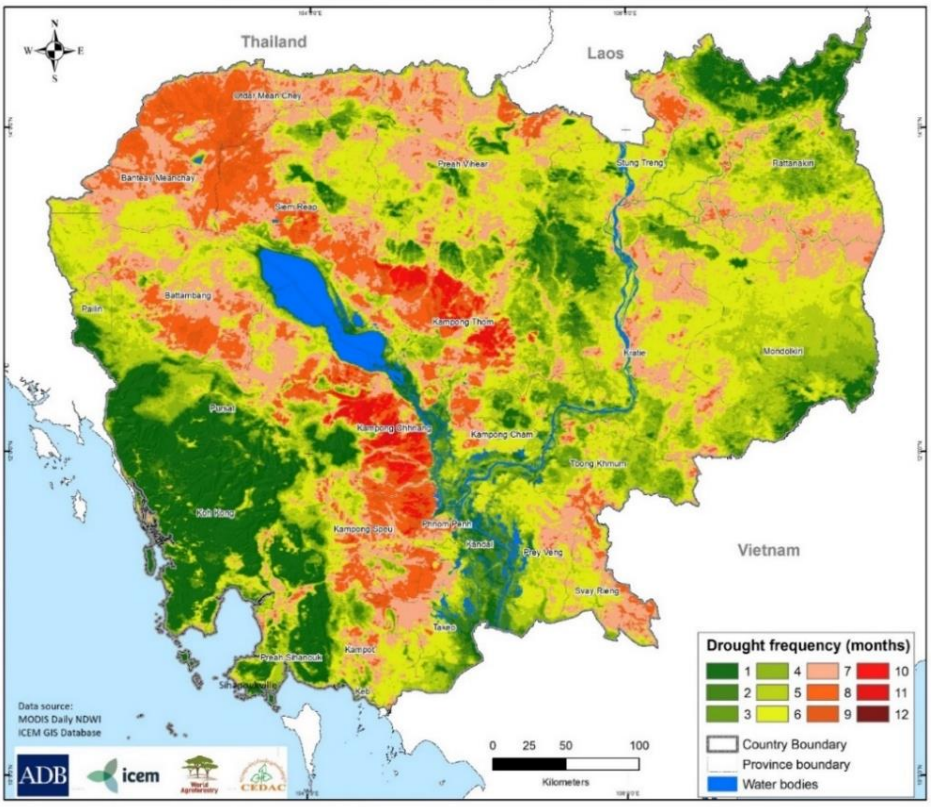
Forest and biodiversity management and restoration are directly linked to mitigation and adaptation to climate change. In 1995 Cambodia ratified the United National Framework Convention on Climate Change (UNFCCC) and in 2002 it acceded to the Kyoto Protocol. The Government signed the 2015 Paris agreement and has presented its report on Nationally Determined Contributions (Feb 2017, updated version Dec 2020).

MoE is required to support the forestry sector governance by "reducing greenhouse gas emissions from the forestry sector to zero percent before 2040". To be able to comply with this commitment, the ministry defined these strategic goals:

- Achieving a balance between anthropogenic GHG emissions by sources and removals by carbon sequestration in the forestry sector;
- Improving livelihood opportunities of local communities to reduce their dependence on forest products; and
- Strengthening the production of timber and fuelwood from plantations and protect natural forests; the latter request having significant relevance for the future management of production forests.

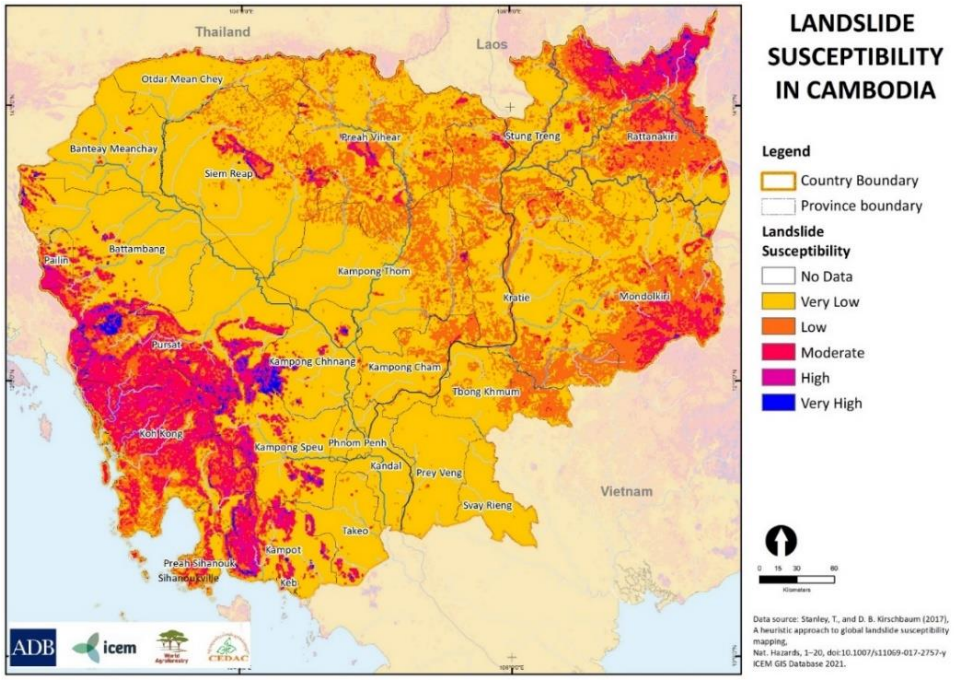
Cambodia is an overall low-level contributor to climate change, but is suffering much of the consequences in form of changing weather patterns that affect agriculture and ecosystem health and increases the intensity of weather-related natural disasters through flooding, landslides, droughts and storms (Figure 4.1 and Figure 4.2). The National Adaptation Programme of Action – NAPA (MoE 2006) outlines priorities identified by stakeholders to address climate change resilience. The programme aims to guide the implementation and coordination of adaptation measures through a multi-stakeholder participatory framework and strengthen the synergies between different environment and development initiatives.

Figure 4.1: Annual Drought Frequency in Cambodia



Source: MODIS Daily NDWI

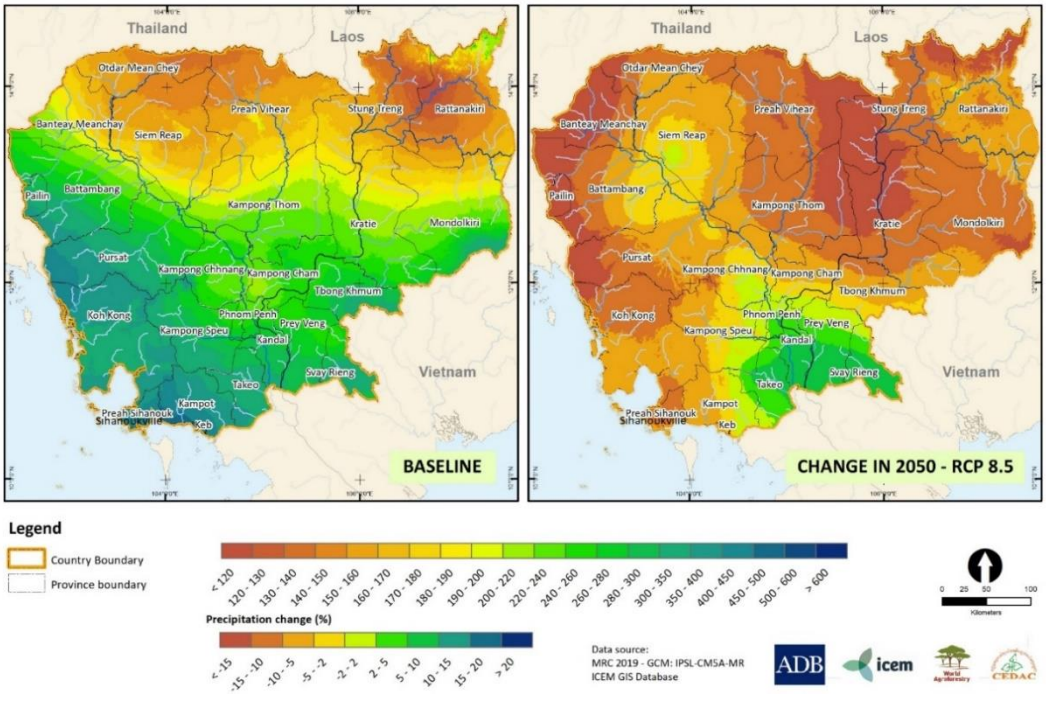
Figure 4.2: Landslide Susceptibility in Cambodia



Source: Stanley and Kirschbaum, 2017

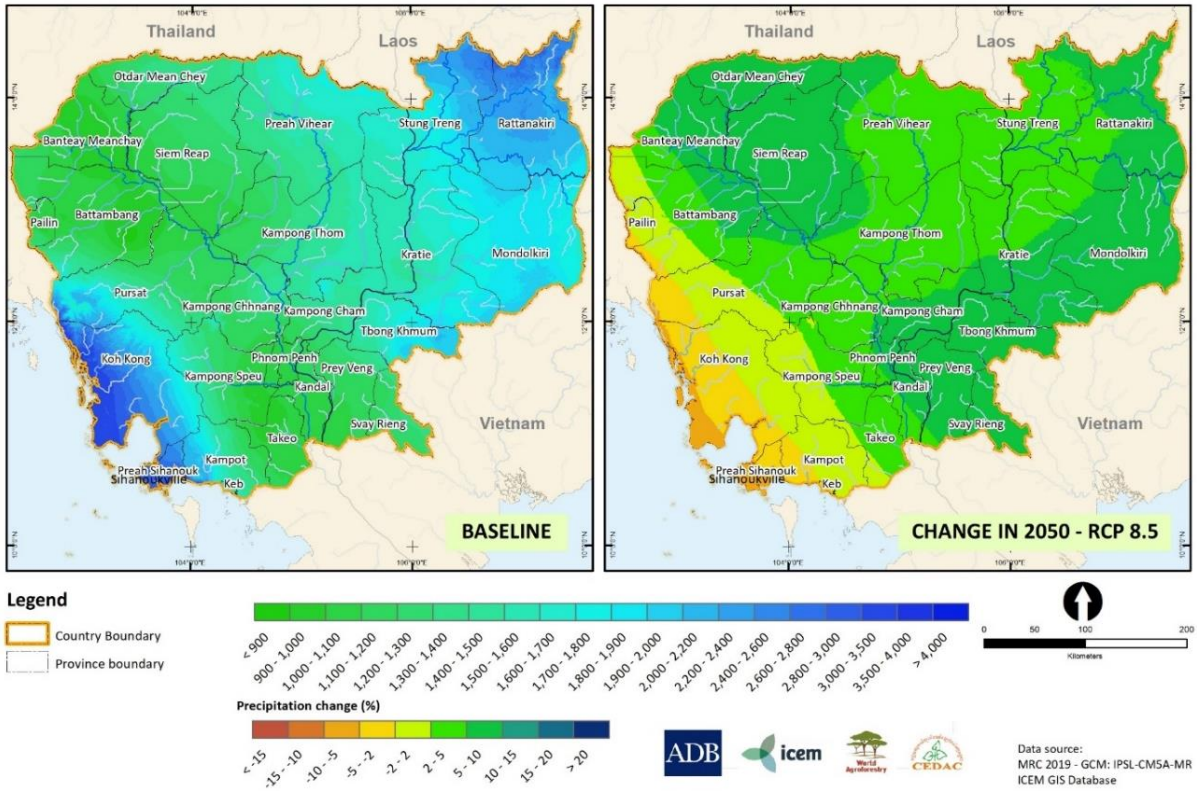
Natural disasters have increased due to climate change and led to: (i) unpredictable delays in rainfall onset in the early wet season, (ii) erratic variations in wet season rainfall onset, amount, intensity, and duration across different areas, (iii) shorter wet season, and (iv) common occurrence of mini-droughts of three weeks or more during the wet season which damage or destroy rice/crops. Due to climate change, the concentration of rains in shorter periods (Figure 4.3 and Figure 4.4) results in a more substantial impact on the soil. Degraded watersheds are most impacted because precipitation falls on land with limited ground cover and lower infiltration capacity, resulting in soil erosion, gullies, landslides, and flooding (Figure 4.5). These events have caused severe damage to cities, towns, agricultural lands, and infrastructures.

Figure 4.3: Dry Season Precipitation Changes in Cambodia



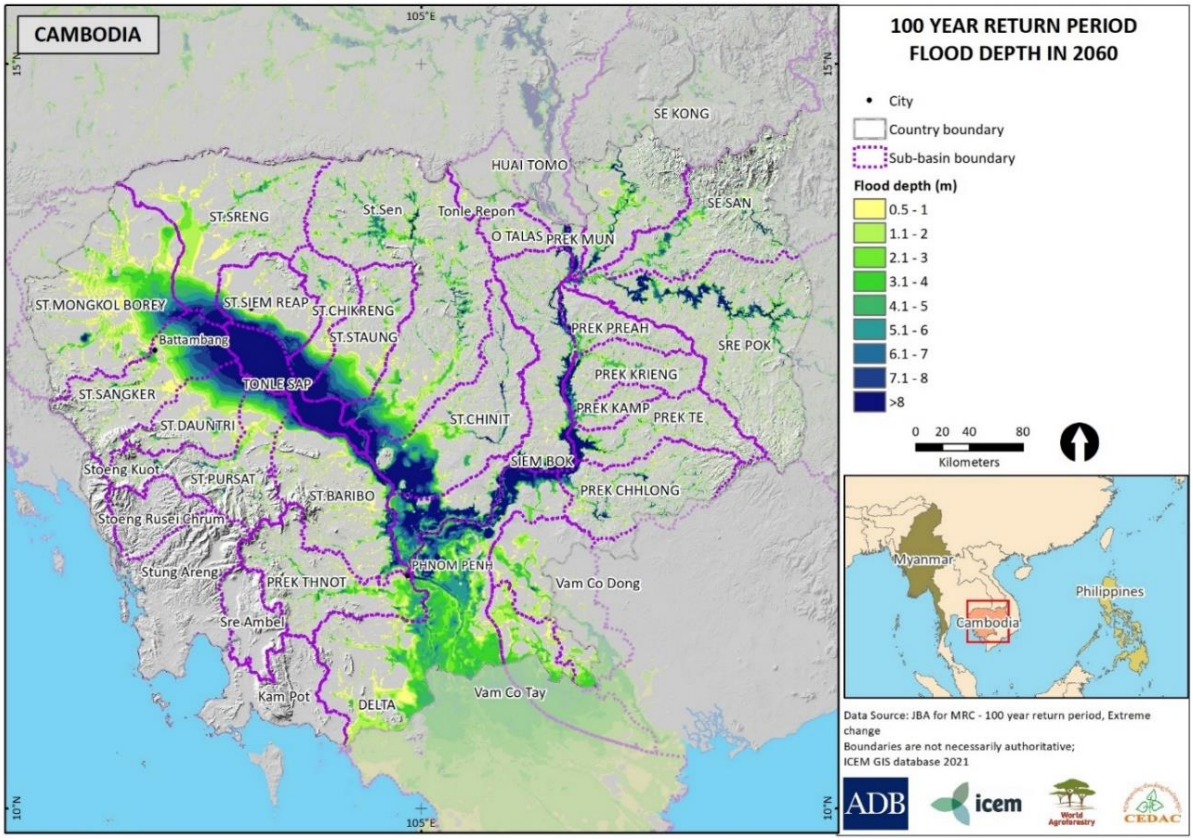
Source: Mekong River Commission 2019 – GCM: IPSL-CM5A-MR

Figure 4.4: Wet Season Precipitation Changes in Cambodia



Source: Mekong River Commission 2019 – GCM: IPSL-CM5A-MR

Figure 4.5: Flood Depth in 2060 in Cambodia under 100 Year Return Period



Source: JBA for Mekong River Commission – 100 Year Return Period, Extreme Change

4.2 Cambodia Climate Change Strategic Plan (2014 – 2023)

The Cambodia Climate Change Strategic Plan (CCCSP) is expected to provide a policy for mitigating climate change impacts and at the same time secure people's support for the mitigation efforts. The Plan would also improve the climate resilience of critical ecosystems such as Tonle Sap Lake, Mekong River, coastal ecosystems, highlands, protected areas, and biodiversity and cultural heritage sites.

The Government plans to promote reforestation and forest rehabilitation based on the protection of soil, water, and forest resources, and at the same time, invest in biofuel production. The strategic objective is to promote climate resilience through improving food, water and energy security. It identifies the watersheds as one of the areas that need to be developed to increase climate resilience and improve the country's food, water, and energy security.

The CCCSP mandates MoE to:

- strengthen biodiversity conservation and rehabilitation of ecosystems affected by climate change;
- Encourage and promote community-based solutions, ecosystem-based solutions and ecotourism as effective ways to respond to climate change; and
- Promote Payment for Ecosystem Services (PES), including REDD+.

The mechanism by which the upland communities would benefit from hydropower dams, irrigations, and fisheries needs to be developed to encourage the participation of the communities in restoration. "The Strategic Objective 3 of CCCSP identified the community-based approaches as cost effective ways of addressing climate change. It also recognizes the importance of community participation in developing land use plans."[17] Community participation and community benefits through payment for ecosystems services (PES) are only briefly mentioned in the CCCS. There are no concrete actions for engaging the communities in restoring the uplands and compensating for their efforts to restore the forests. Except for REDD+ and ecotourism, PES is still not caught on in Cambodia.

4.3 Cambodia's Nationally Determined Contributions

Cambodia's Updated NDC to the UNFCCC (Dec 2020) defines the target of total GHG emissions reduction by 2030 (all sectors) to be approx. 64.6 million tons CO_2 eq/year (41.7%). To reach this goal, essential elements are reducing deforestation by half, increasing carbon sequestration in forests, and reaching a forest cover of 60% by 2030. In addition, MoE has committed to support governance of the forestry sector in the effort to reach zero GHG emissions from this sector in 2040.

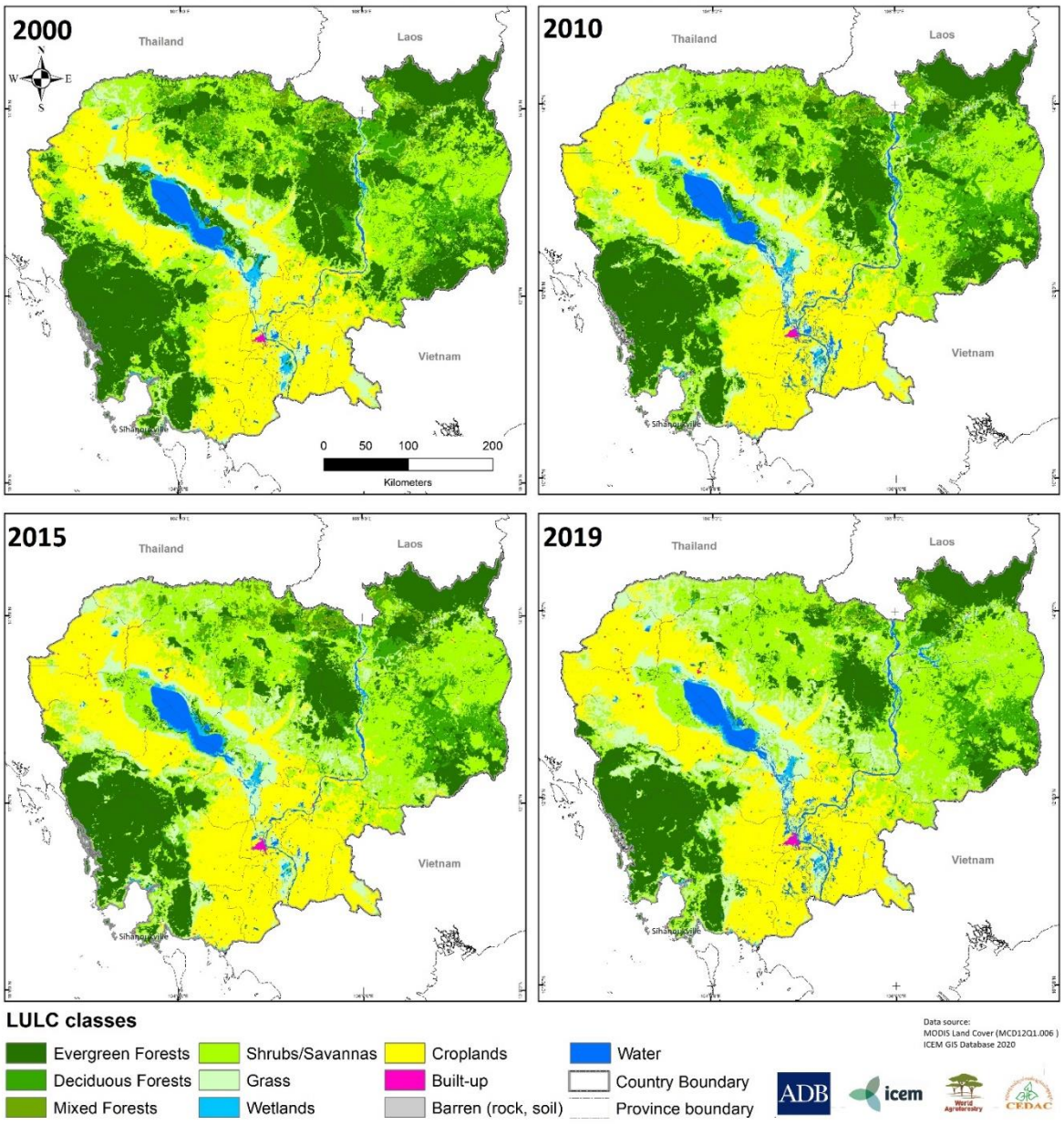
1. Achieving a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gas emissions from the forestry sector;
2. Improving livelihood opportunities for local communities and reducing their dependence on forest products; and
3. Strengthening the production of timber and fuelwood from plantations and protecting natural forests.

[17] https://www.irdfa.org/wp-content/uploads/2015/01/Study-on-The-Policy-and-Legislative-Framework-for-Forest-Restoration.pdf

5 Land Use Challenges

Figure 5.1 illustrated the loss of forest cover in Cambodia over 20-year period from 2000 to 2019. Direct and indirect drivers of deforestation and forest degradation in Cambodia include: (i) unclear and insecure land- and forest tenure in certain areas; (ii) increased accessibility to remote forest areas; (iii) expansion of agro-industrial concessions; (iv) widespread illegal logging; and (v) unsustainable harvesting of forest products. Improved monitoring and control could mitigate some of these drivers, assuring that the responsible authorities and their local staff have adequate capacity, resources, and commitment to manage the forest estate.

Figure 5.1: Land Use and Land Cover Change in Cambodia from 2000 to 2019



Source: MODIS Land Cover (MCD12Q1.006)

5.1 Restoration Needs and Potential

Cambodia´s natural heritage has been heavily impacted, and urgent action is required to create an ecologically sustainable future. Forest restoration is the principal management strategy applied to degraded primary forests (ITTO, 2002). It is a process of rebuilding ecosystems to an earlier or more desirable stage (Dudley, 2005). Forest restoration aims to enhance and accelerate natural processes

of forest regeneration to re-establish a healthy and resilient forest ecosystem. It is perceived as a way where the species composition, stand structure, biodiversity, functions and processes of the restored forest will match, as closely as feasible, those of the site-specific original forest (ITTO, 2002). Because of the persistent physical, chemical, and biological barriers to forest regeneration, according to Shono et al. 2007, severely degraded areas need human intervention to initiate recovery. ITTO (2002) and Mansourian (2005) suggest that the sociocultural, economic and ecological aspects of a forest landscape should be considered in the restoration and management of degraded areas and their rehabilitation.

Some degraded ecosystems are able to recover naturally but many do not because of ongoing stressors and altered climaxes in the process of ecological succession such as forest to grasslands. When a natural recovery process does take place, it could, however, be very slow. To speed up the process, human intervention would often be needed to start the recovery or accelerate forest regeneration (Lamb & Gilmour, 2003). Restoration should not focus on trees alone but considers accompanying elements that go with healthy forests, such as nutrient cycling, soil stabilization, medicinal and food plants, and forest dwelling animal species (Mansourian, 2005). Strategies for re-colonizing land would often include species that produce widely spread seeds. These species often have strong and fast vegetative regeneration (e.g., from roots or rhizomes) once the plants have been established from seed.

The Red Lists of Ecosystems shows the application of a new tool (National Biodiversity Status Report 2016). One goal is to improve restoration prioritization using pilot actions in Cambodia focused on implementing innovative pilot models in Kampong Thom, Preah Vihea, and Siem Reap. The large amount of land in those three provinces is used for low-productivity agriculture, and offers substantial opportunities for restoring the environment. When coupled with areas that have high potential for natural regeneration, restoration costs may be reduced.

The extent to which Cambodia succeeds in achieving the ambitious targets of environmental recuperation will depend, in large part, on the effectiveness of prioritizing areas for restoration. Planners and other stakeholders must develop frameworks that adequately consider the multiple objectives of restoration and trade-offs between biological conservation, ecological integrity, and ecosystem goods and services.

Restoration can be technically challenging and expensive - except for natural regeneration as a passive restoration. According to IPBES (2018), to ensure ecosystems services, it is more cost-effective to conserve intact ecosystems than to restore degraded landscapes. The United Nations Convention to Combat Desertification (UNCCD) goal of land degradation neutrality (LDN), the Sustainable Development Goals (SDG) and the CBD Aichi Targets can also be understood in the same way, and have established targets for ecosystems restoration.

The UN General Assembly March 2019 declared 2021-2030 as the UN Decade of Ecosystem Restoration. “Governments have also agreed on ecosystem-specific restoration targets. For example, Target 12 of the Ramsar Convention’s Fourth Strategic Plan 2016-2024 focuses on restoring degraded wetlands and priorities those relevant to biodiversity conservation, disaster-risk reduction, livelihoods and/or climate-change mitigation and adaptation. The UN Forum on Forests (Goal 1), the Bonn Challenge, and the New York Declaration on Forests all include forest-specific restoration commitments”[18].

5.2 The Costs and Benefits of Restoration

International mechanisms for forest conservation and restoration financing include REDD+ and the EU Forest Law Enforcement, Governance and Trade (FLEGT). Progress on Cambodia’s Voluntary Partnership Agreement (VPA) in FLEGT has stalled in recent years.

[18] https://www.oecd-ilibrary.org/sites/f71c8feb-en/index.html?itemId=/content/component/f71c8feb-en

A cost/benefit analysis of FLR would include lost opportunity costs form timber and agriculture (which is small is severely degraded areas), capital costs for fencing and revegetation, transaction costs such as local organizing and negotiation, and land monitoring and protection. For that reason, the costs vary a lot based on the type of restoration, land tenure and use, and especially the level of degradation before the work starts. Trade-offs might also exist between the goals of land restoration and policy objectives. While there is a shortage of information on the restoration costs, available evidence indicates that project costs can range from hundreds to thousands of $ per hectare for grasslands, rangelands, and forests, tens of thousands of $ per hectare for inland waters, and millions of $ per hectare for coral reefs.

The ecosystems services that could be delivered vary according to their type, volume, land cover, location, and timeline. Some would take decades to fully recover to a pristine state, e.g. wetlands. "Restoration success is context-specific, with some areas (e.g. tidal and tropical in the case of wetlands) recovering more rapidly than others. The value of ecosystem services provided by restoration is also highly dependent on the density and number of beneficiaries".[19]

Grandis Timber in the Kampong Speu Province is a successful example where the firm has been able to produce high-quality, certified timber on 4,825 ha of previously degraded land. At maturity, the trees – mostly teak – are expected to store almost 1 million metric tons of CO_2eq. The firm is also supporting the communities in and around its concession by building roads and schools, and providing wood waste as energy source for the local garment factories.

5.3 Insecure Land and Forest Tenure

Opportunists often cleared forests to lay claims to land prior to the arrival of the land titling teams. In indigenous areas, communal land was not offered title as part of the land titling program (Directive 01), so many indigenous communities were forced into accepting private titles, even though many were in the process of obtaining a communal title. Private titles issued within communal areas resulted in a breakdown of indigenous community cohesion. Indigenous women have traditionally collected resources such as firewood, forest vegetables, fruit, and mushrooms. Greater tenure security over customary land and resources would protect indigenous communities' land and forests and particularly benefit women and ultimately the whole household. Forest clearing in indigenous areas has led to difficulties in collecting firewood and has also caused the water table to drop, resulting in problems in collecting water, which women traditionally carry out. Accommodating these multiple uses through improved tenure security would mean young women would migrate less out of the village, maintain their traditions, and help their families. It is important to note that indigenous customary tenure systems give women equal rights to use the village land.

The mentioned situation and other pressure from outside have often resulted in a breakdown of community cohesion, leading to a crisis of customary forest land. The problem of centralized decision-making over land use results in a lack of authority of both local elders and sub-national government officials to protect people's rights and manage conflicts. Local authorities often tell villages who are in disputes with large concession companies that they have to petition with the Prime Minister because only he has the authority to intervene. So, while the power of the traditional leaders is being eroded, state authorities are also unable to resolve the conflicts. One consequence of centralized state control is that state land and resources are seen as unmanaged and open for exploitation.

Lack of forest estate demarcation has resulted in uncertain land tenure and unauthorized encroachment. The insecure land tenure goes hand-in-hand with insecure tenure to the forest resources, both for timber and NTFP. Large-scale land titling interacts with locally embedded land tenure systems to produce new forms of fragmentation (Dieport & Sem, 2016). To counter this problem, over the period of 2018 to 2027, at least 750 km of boundaries in production forest areas, including high-conservation value sites, are planned to have their outer boundaries identified, demarcated in the field and on maps, and registered and digitized in an IT-supported databank

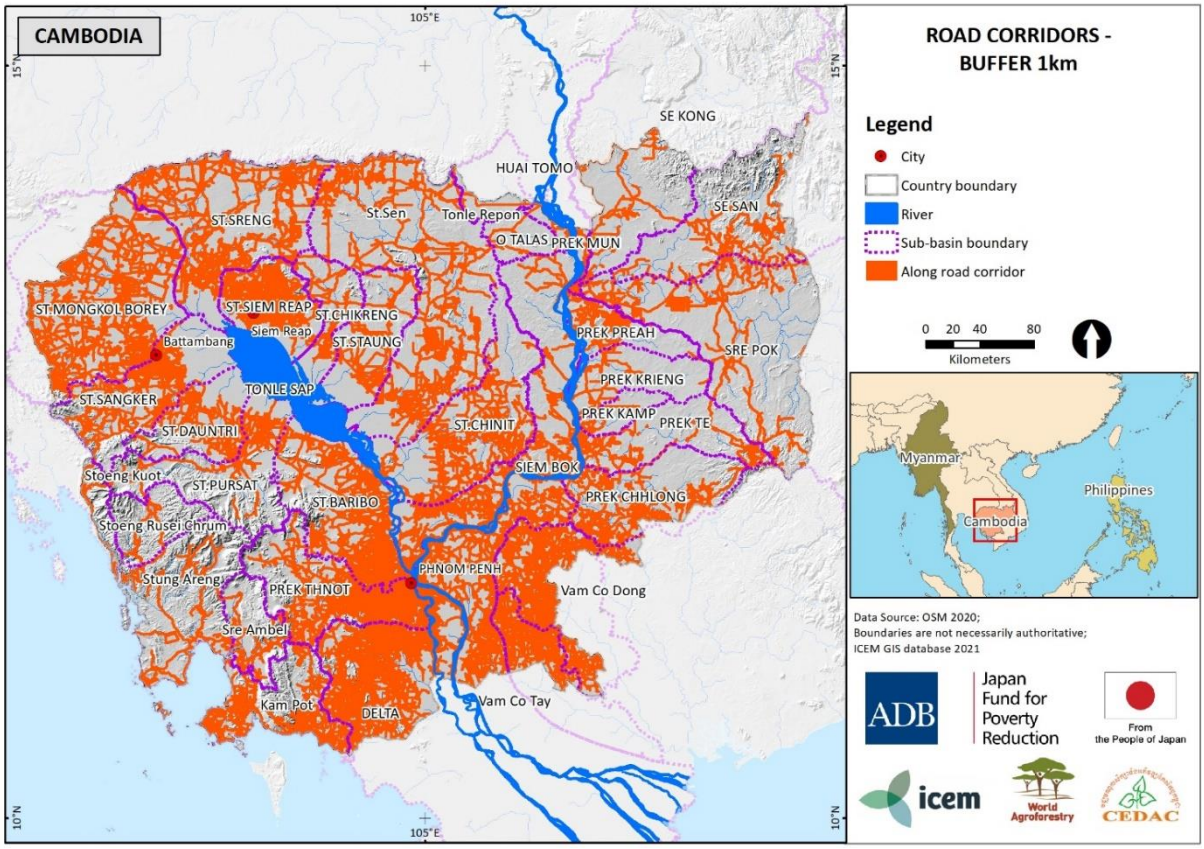
[19] https://www.oecd-ilibrary.org/sites/f71c8feb-en/index.html?itemId=/content/component/f71c8feb-en

managed by FA. Systematic data collection of forest resources is planned to be facilitated by the implementation of a National Forest Inventory (NFI) and the establishment of a Forest Resource Management Information System (FRMIS) with data collected and reported under the National Forest Monitoring System (NFMS). The NFI and the FRMIS will provide data on the condition of the forest resource, concessionaires and forest industry statistics, and market intelligence. The NFI will include production forests, protection forests and areas under ELCs.

5.4 Increased Accessibility to Remote Forest Areas

The reduction or elimination of armed conflicts in rural areas, together with opening up of new areas with improved road system, brings advantages to the local population, but at the same time, a danger to the forest cover (Figure 5.2). Together with increased emphasis on agricultural production, these factors have led to gradually increased deforestation, especially until 2010. During the last decade, production forestry has, however, evolved from an earlier main focus on commercial logging in isolated areas, high government revenue, and industrial development, towards more use of forests for subsistence purposes, poverty alleviation through forest land allocation to village communities and households, and local trade in forest products. Few large-scale commercial producers were substituted by many small-scale operators at subsistence level, which is a potential threat for the goal of maintaining contiguous forest areas. Therefore, this paradigm shift calls for a number of strategic adjustments, some institutional and others technical, to achieve more sustainable forest management. In addition, the institutional reform in the forestry sector resulted in a new composition of the production forest area under MAFF that needs to be re-assessed in terms of quantity and quality.

Figure 5.2: Road Corridors in Cambodia



Source: OSM 2020

5.5 Expansion of Agro-industrial Concessions

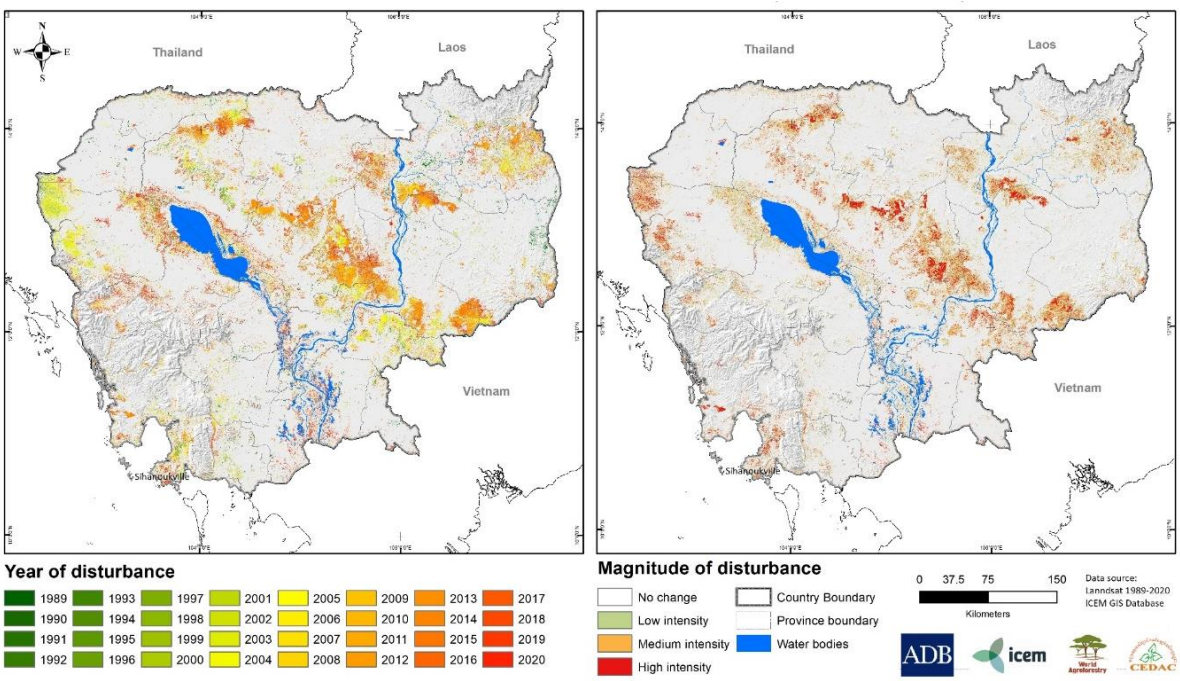
Commodity production has driven the bulk of tree cover loss in Cambodia – particularly rice and rubber plantations, but also maize and cassava. The agroindustry is very basic, and most commodities (paddy rice, cassava, maize, cashews, cattle, and soy bean) are exported in raw form. The rice prices

in the international markets and the RGC 2010 policy "Promotion of Paddy Production and Rice Export" have led to the growth of the modern rice agroindustry. Transport and trade sectors also generate some income from moving/trading agricultural products, estimated at 50% and 30% of the sectoral value-added, respectively. Agribusiness accounted for 9% of the GDP and 27% of the agricultural GDP in 2012.

5.6 Illegal Logging

An important cause for the extent of illegal logging is to supply China's huge demand for timber, including rosewood for luxury furniture, often transported through Vietnam. Checkpoint data obtained by the conservation group Forest Trends showed that more than $115 million worth of logs and sawn wood was registered by Vietnamese officials January - September 2016. Illegal logging industry was valued at $2 billion by the London-based Environmental Investigation Agency in 2014, with Cambodia occupying fifth place on the list of biggest contributors. Global Forest Watch[20] deforestation alerts are showing widespread deforestation in Cambodia in 2020 and 2021. In addition, Figure 5.3 showed that primary forest loss events happened since 2000.

Figure 5.3: Vegetation Loss in Cambodia from 1989 to 2020



Source: Landsat 1989-2020

5.7 Unsustainable Harvesting of Forest Products

The causes and effects of deforestation and forest degradation have been analyzed and evaluated in numerous reports and publications including the National REDD+ Strategy (RGC, 2017a). The major causes are mainly from factors outside the forestry sector, including the rapid growth of the rural population, the expansion of agriculture and settlements into forest areas, rural poverty and lack of alternative livelihoods, the allocation of large-scale agro-industrial land concessions (ELCs), the distribution of land titles under social land concessions (SLCs), weak forest governance, law enforcement, and monitoring of forest and land use coupled with uncertain land and forest tenure. The rapid expansion of cash crop plantations (rubber, cashew, cassava, biofuel), rural infrastructure development, and high demand for biofuel have further contributed to deforestation and forest degradation.

The effects include a loss of raw material supply to the forestry sector and consequently a loss of tax revenue and fuelwood and charcoal shortages, creating a significant gap between supply and demand.

[20] https://www.globalforestwatch.org

Without new initiatives, this can create additional pressure on natural forests in the future. Environmental impacts include a loss in biodiversity, increased soil erosion during the wet season, decreased water flow during the dry season, and increased vulnerability to climate related disasters such as flooding and landslides. In addition, the coastal areas have become more vulnerable to climate related natural disasters (typhoons and tsunamis) due to the degradation of the mangroves.

Combating and halting the root causes of deforestation and forest degradation is an indispensable pre-condition for preventing further decline of the forest resource. Furthermore, controlling the unsustainable harvesting of forest products would facilitate investments and perform an important step toward achieving sustainability.

6 Restoration Experience and Lessons

Cambodia has many cases of relatively successful forest restoration. Those experiences also illustrate the challenges and lessons learned on carrying out landscape restoration. This chapter explores a diversity of cases and draws from them valuable lessons to guide future restoration efforts.

6.1 Government Restoration Initiatives

Improving Capacity on Forest Restoration in Cambodia (Phase II) was a one-year project from 2012 implemented by the Forestry Administration of MAFF with financial support from the Korean Forest Service[21], which was found to comply with the national conservation policy and its strategy for involving communities in sustainable management of the forest resources. It that way it contributed to poverty alleviation, in line with the Government's Rectangular strategy II: "The government acknowledges the need for sustainable use of the remaining forest resources for the benefit of its population, particularly local communities."

The research study *reforestation of degraded forests by direct seeding* carried out three forest restoration trial in the Siem Reap province, which is situated in a dry region. The research was able to compare the growth of seed and seedling, and with the finding that direct seeding in the field with leguminous species could greatly reduce cost of reforestation. The trial plots will be used for both research and education purposes during a 5-10 years period. One finding from the mentioned trials was the adoption of different species with use of the direct seeding method, and another was how to cultivate tissue under laboratory conditions. The development of a participatory community FLR process with poverty reduction was partly based on training received in the Korea Forest Research Institute (KFRI) and support of an advisor from KFRI.

The ASEAN-ROK Forest Cooperation (AFoCo) between ASEAN and the Republic of Korea initiated in 2012 with the goal to reduce deforestation and forest conservation in ASEAN member countries, promote sustainable forest management, and transfer this experience to other countries in Asia.

Biodiversity Conservation Corridors Project (2011-2020): A previous investment grant from 2006-2011 connected seven protected areas situated in 22 communes in the Koh Kong and Mondulkiri provinces, which was followed in 2011 by a $19 million financing from the ADB for sustainable management of community-based biodiversity landscapes. The Biodiversity Conservation Corridors Project (BCC) was focused on biodiversity rich forest landscapes of the Cardamom Mountains and Eastern Plains Dry Forest in Cambodia. Capacity building and other support aimed to improve forest and land management as well as strengthen local livelihoods. More than $1 million was allocated to forest restoration activities in Mondulkiri, dry land restoration in Koh Kong, and mangrove replanting activities.

The Arbor Day is a national tradition 1952 when King Samdech Preah Norodom Sihanouk established the day to encourage reforestation and forest conservation, as well as environmental protection. The King of Cambodia has been presiding Arbor Day on July 9 since its first celebration in 1990. The day is a national event for planting of trees and encouragement of forest protection, with more than 20,000 seedlings are planted annually.[22]

Forestry Administration Director, Dr. Keo Omalis announced in 2019 that Cambodia has set the goal of planting more than 25,000 ha of trees each year in areas that have been deforested. He called on the relevant authorities to work with stakeholders in the private sector and with people in those areas in order to achieve this goal.

[21]https://www.irdfa.org/wp-content/uploads/2017/11/Improving-Capacity-on-Forest-Restoration-in-Cambodia.pdf
[22] https://anydayguide.com/calendar/1560

"I would like to appeal to all venerable and local authorities, and to Cambodian compatriots across the country to join and plant all kinds of trees including palm trees at pagodas, in public spaces, at resorts, along the roads as well as on farmland" - King Norodom Sihamoni, National Arbor Day 2019.

Recently Cambodia celebrated the International Day of Forests 2021, under the theme "reforestation", aimed at curbing illegal logging in the country.

6.2 Projects Supported by International Development Partners

6.2.1 Cambodia's First Forest Stewardship Council Certified Sustainable Plantation, Grandis Timber

The Green Invest Asia project financed by The United States Agency for International Development (USAID) supported an equity investment in Grandis Timber, supported by different international financial institutions. The firm Grandis Timber achieved Forest Stewardship Council (FSC) certification of its plantations, which was the first FSC certification in Cambodia.[23]

The firm has reforested 3,700 ha of previously degraded land in the Kampong Speu Province, to produce raw material for certified ethical furniture grade timber, mostly teak (*Tectona grandis*). The trees are estimated to provide a carbon sequestration of approximately 1 million tons CO_2eq at maturity. The company also supports local communities situated in and around the concession and the sales of forest biomass to be used as an energy source in the local garment factories. Grandis Timber provides a rare example of sustainable timber and carbon storage in an emerging economy. USAID financed the project through the platform USAID Green Invest Asia. USAID also supported the Cambodian firm's analysis of social and environmental performance before the investment, and gave advice on financing and financial structuring.

"Delivering responsible and sustainable projects in forestry and agriculture in Cambodia is far from straightforward, and as our operations expand, we hope to collaborate again with USAID Green Invest Asia as a partner that understands these challenges" - Grandis Timber.

The positive results achieved by Grandis Timber could be an example for other companies in Cambodia and SE Asia, with the expectation to increase FSC certification, since for the moment less than 6% of the forests certified by FSC are found in this region.

Box 6.1: Legacy of Grandis Timber Ltd

June 2009: Grandis Timber submits an Economic Land Concession (ELC) proposal to MAFF.

December 2009: Grandis Timber entered into a contract with MAFF for the reforestation of a concession 70 km southwest of Phnom Penh. Grandis Timber holds this 7 900 ha Economic Land Concession on a 50-year lease.

December 2009: Grandis Timber signs an ELC agreement (soft title) with an initial size of 9 820 ha.

December 2010: Grandis Timber conducts an initial EIA and submits a Master Plan to the authorities.

March 2013: Start of the final ELC demarcation and land titling process. The firm did not require any resettlements.

August 2015: 17 State-Public Titles are issued based on an extensive consultation process.

August 2016: Sub-decree 175 is approved, permitting conversion of land titles, and final Certificates of Possession to Grandis Timber.

Lessons learned

Reforestation should be linked with international or domestic private companies that have the technical, managerial, and financial capacity to ensure efficient and sustainable reforestation practices. At the same time, it should respect the universal principles of sustainable forestry based on

[23] https://greeninvestasia.com/usaid-facilitates-investment-into-cambodias-first-sustainable-plantation-grandis-timber/

environmental, social and financial sustainability, and long-term economic opportunities with the regional and global markets.

To avoid short-term planning based on profit, long leases/concessions are required on public land (where private property is no alternative). In these areas, master plans for sustainable forestry should include long-term planning of investment, management, logging areas, replanting, and complemented by yearly operational plans.

In order to manage the operations efficiently and with social benefits, local manpower should be preferred, as well as collaboration with communities and other local stakeholders, considering livelihoods and food security.

Figure 6.1: Grandis Timber Photo Gallery

Source: Courtesy Grandis Timber, http://www.grandistimber.com/photo-gallery/

6.2.2 Forest Restoration in O Soam and Tbeng Lech Community Forest

The Asia-Pacific Network for Sustainable Forest Management and Rehabilitation (APFNet) project in Cambodia focused on forest restoration in community forests (Figure 6.2). The project objective was to increase timber and NTFPs for improved livelihoods.[24] The project considered the multi-function of the forest for the rehabilitation of degraded land. It trained local communities in O Soam, Kampong Thom Province, and Tbeng Lech, Siem Reap Province on forest restoration, including parts of the community forests. Activities conducted were training on plantations, nursery establishment, silviculture, research/demonstration plots, and dissemination of the project's results to relevant stakeholders.

Before applying the forest restoration model, the project examined existing forest conditions, including soil, trees, other vegetation, wildlife, and the dependence of local communities on the forest resources. Forest restoration was the principal land management strategy, and was applied to degraded primary forests. The process had the purpose to rebuild ecosystems to something similar to

[24] https://www.irdfa.org/wp-content/uploads/2017/11/Technical-Notes-on-forest-restoration-in-community-forests.pdf

their natural stage or alternatively improve. Some natural recovery can occur, but that is a very slow process, however there are other cases where the ecosystems are too degraded to be able to recover without human intervention. The restoration model did not only involve reforestation, but did also consider e.g. soil and the availability and cycling of nutrients, multi-purpose species, and species of animals natural to the ecosystems.

The project prioritised tree species to be introduced and planted in community forests depending on classification of endangered or threatened forest species. Capacity building with a training program was provided to the communities by project experts through practical involvement and engagement in the process of piloting forest restoration and extension activities, covering seed collection and storage, germination trials, nursery production of seedlings and field management to strengthen forest restoration.

Figure 6.2: Community-based Planning and Implementation of Forest Treatment Plots

Source: https://www.irdfa.org/wp-content/uploads/2017/11/Technical-Notes-on-forest-restoration-in-community-forests.pdf

Lessons learned

The project motivated the community to conserve their community forests and utilize them in a sustainable manner. It improved and strengthened the technical capacity of local communities and staff from the local Forestry Administration on forest restoration. The improved community knowledge and technical capacities were found to motivate the local people to protect their forests.[25] This resulted in the gradual recovery of the community forests including the NTFPs.

Challenges in restoration of community forest: Along with the vision, the community aimed to develop their forest-based enterprises including processing and trading of honey and other NTFPs, such as rattans. "Achieving the vision of the community was constrained by the limited funds to finance development activities (e.g. production of seedlings, enrichment planting, value adding of NTFPs, protection, and marketing of the products). Technologies of low-cost restoration, as well as efficient utilization of the forest products were also challenging. To achieve the vision, different strategies were needed either to take advantages of the current strengths and opportunities or to minimize the impacts of weaknesses and threats."[26]

6.2.3 Peam Krasop Community Protected Area: Mangrove Restoration and Ecotourism

Peam Krasop Wildlife Sanctuary consists of well conserved mangrove forest, and is the only National Protected Area in the country that covers mangroves. This Wildlife Sanctuary is associated with the Koh Kapik Ramsar Site, which has been designated as an internationally important wetland for

[25] https://www.irdfa.org/wp-content/uploads/2015/01/A-Survey-Report-on-Participatory-Resource-Appraisal-for-The-Project-Multifunction-Forest-Restoration-and-Management-of-Degraded-Forests-in-Cambodia-n-Tbeng-Lech-and-O-Soam-CFs.pdf

[26] Edward, V.M 2014. Forest Restoration in Community Forests

migratory waterfowl. Conflicts have increased among stakeholders involving local communities, local authorities and sanctuary authorities on the use of natural resources in the area.

Peam Krasop Wildlife Sanctury was designated as a National Wildlife Sanctuary with International Wetland Importance, however its policy, strategy and management plan have yet to be put in place and 'Best practices' have not been fully applied.

Peam Krasop Community Protected Area and also Community Fishery is a natural tourist site located in Bang Kayak village, Peam Krasop commune, Mondul Seima district, Koh Kong province. International tourists can travel to this area in just 20-25 minutes from the provincial town, a distance of about 7 km. The CPA of Peam Krasop Nature Reserve is the most important and attractive tourist destination of Koh Kong province. The area receives tens of thousands of national and international visitors each year due to its significant tourism potential.

Peam Krasop Community Protected Area has high potential as follows:

- The largest mangrove forest in Asia (50,000 ha);
- High biodiversity, with ecosystems that are habitat for aquatic mammals, fish and shellfish;
- Sea dolphins constantly migrate from the waters in front of Peam Krasop Beach to the waters of Trat Province, Thailand;
- Ancient wells with fresh water that can be used by the people in all seasons;
- 50 m swing bridge to walk along the canal, 600 m concrete bridge inside the mangrove area, and a 17 m high tower for visitors to climb and enjoy the lush views of the mangrove forest, creeks and seas; and
- Important community services such as food and souvenirs, boat rides, canal tours, mangrove forest views, birds, monkeys, tamarinds at night and fishing villages of local people.

The Peam Krasop Community Protected Area was established in 1997. It is designed to develop into a model community of the province with support of the provincial authorities, in collaboration with projects, organizations and funds from various departments, with the vision to manage, protect and conserve natural resources. The Provincial Department of Tourism have participated in the development of the concrete bridge so tourists can visit the mangrove forest directly (Figure 6.3).

Mangrove Resource Conservation and Coastal Environment Protection to Enhancing Local Community Livelihoods of the GEF Small Grants Programme (SGP) managed by UNDP provided financial support to this CPA since 2009-2010. This project aimed at protecting 5,466 ha of existing mangrove areas and developing Community Based Ecotourism inside the UNEP-SCS demonstration sites in Peam Krasop wildlife sanctuary, planting 50 ha of mangrove trees, and addressing the conservation and sustainable use of natural resources, mainly fisheries and mangrove resources. Support to community-based livelihood alternatives include ecotourism and organizing two women saving and self-help groups.

With the technical and financial support from the Cambodia Biodiversity Conservation Corridor Project via MoE, 750 ha of degraded mangrove forest was replanted by community members from 2013-2016.

Lessons learned

Despite national and international obligations to protect and manage the site, a strict protection approach is not possible and in practice would not be successful due to the significant number of people that are living and surviving upon the natural resources. This must be taken into consideration in any long-term plans for sustainable use of the area.

The most important lesson learned is that an efficient approach is conservation through sustainable development. This includes supporting the local population in their personal use and income creating activities based on the local natural resources, as long as the resources are managed sustainably. In that way the people have an incentive to protect and conserve their livelihood for the future.

Figure 6.3: Mangrove Planting in Peam Krasop Community Protected Area

Source: Khun Bunnath

6.3 Summary of Case Study Lessons

6.3.1 Key Success Factors Identified for Restoration in Cambodia

In view of the mentioned case studies and other projects, as well experience of the national project team and consultations with the Government, it has been possible to outline some success factors for land restoration in Cambodia. Communal and local land and forest restoration approaches involving decentralized institutions and beneficiary local communities constitute means of success, both technically and economically. In this context, the choice of native species, for the most part, will call on the people's knowledge for their development, which may eventually lead to the establishment of promising value chains. However, successful reforestation must prioritize species preferred by the local population and are expected to have a local use or market.

The evaluation of costs and benefits of these restoration operations underway in Cambodia reveal multiple innovative approaches to restoration that could promote sustainability of the interventions. The restoration process, whether it is matter of forest landscapes or degraded agricultural landscapes, is not an end in itself because restoration represents only the physical and environmental dimension/aspect. Indeed, any production system (agricultural, agroecology, agro-industrial) is characterized by two sets of factors: (i) Non-evolving factors, at least at the scale of human life; and (ii) the physical dimension of the agro-ecosystem (soil, climate, habitat, biodiversity).

Deforestation is an important factor that leads to land degradation, especially on poor soils and steep slopes. Land and forest tenure are key issues if local communities are expected to invest in land restoration, because they need assurance of future benefits from their investments. This has also been the experience on a global level from different continents. The positive lesson is that restoration can contribute to both secure land and forest tenure and long-term economic value for local communities.

6.3.2 Key Weaknesses

The establishment of forest plantations has been promoted by Ministry of Agriculture, Forestry and Fisheries in open forest areas, degraded mountainous areas and watersheds that are strongly affected by soil erosion (MAFF, 2015, Agricultural Sector Strategic Development Plan 2014-2018). However, the overall results of initiatives for reforestation, forest rehabilitation and natural forest regeneration have been limited due to reasons such as unclear land and forest use rights, lack of funds and fiscal incentives, difficult access to forest seedlings, and inadequate technical support and extension services. The risks involved in long-term investments in reforestation have not been attractive compared to short-term agricultural options, with more flexibility and acceptable direct benefits.

The risks involved in long-term investments in reforestation are not attractive compared to short-term agricultural options with more flexibility and quicker returns. There is also a lack of awareness of the importance of forestry resources among relevant stakeholders. Many CFs/ CPAs have faced challenges in legally selling and marketing their products (timber, fuelwood and charcoal) due to their limited capacity and resources to comply with administrative regulations, including the five-year mandatory interval between approval of their management plan and permission to sell forest products. Other issues are restoration technical difficulties in terms of restoration zoning, mapping and assessment, techniques to use on degraded and eroded land, community engagement in nursery production and tree planting, silviculture and maintenance of the plantation, surveillance and protection against illegal exploitation, value chain development, administrative and organizational problems in local economic forestry units (community micro enterprises), etc.

Private sector production forestry is still a weakness in Cambodia. The framework conditions for the private forest sector must be improved to successfully develop sustainable production and exploitation of both timber and fuelwood. At the same time, efforts should be made to support forest communities in developing sustainable forest management to benefit their livelihoods and increased local income. The production forest cluster established could contain forests managed by companies, government departments, and community-managed forests. Participants in the production forest cluster should be encouraged to work together to share forest production technology and practices, and eventually to marketing and value chains.

6.4 Lessons Learned on Gender Involvement

Women and men who are living in the rural communities extract the benefits directly and indirectly from the forests in order to contribute to their livelihoods. Climate change and deforestation threaten the local communities.

Even though the forest sector is clearly male dominated, women are finding their place in forest management and decision-making. Women participation and representation in forest management is important because they have a unique knowledge of biodiversity, forest species and use, including which species are most fit for firewood, food, and medicinal purposes. Women collect these resources to improve the family health and nutrition. However, climate change impacts on forests have resulted in reduced crops yields, which, in turn, have a devastating effect on the livelihoods of women and their families.

A number of laws, both national and international, impact gender roles in Natural Resource Management (NRM), biodiversity conservation, and forest protection. The Royal Government of Cambodia has emphasized its commitment to promoting gender equality and female empowerment in strategic programs, institutional structures and mechanisms, and to implement gender policies and strategies to build for gender mainstreaming across sectors. Cambodia is recognized for employing national mechanisms to ensure compliance with international conventions and agreements ratified by the country to end discrimination.

Cambodia has adopted climate and biodiversity conservation related frameworks, many of which include gender components, such as the UNFCCC Lima Work Program on Gender, the CBD Gender Plan of Action, and the UNCCD Mandate on Gender.

The Sub-decree on Community Forestry Management (2003) recognizes the importance of collective participation and contributions to sustainable forest management, and gives emphasis to selection of women for the Community Forestry Management Committee. However, it however does not mention any specific actions to recruit more women to local forestry-related committees and leadership roles.

The Ministry of Environment (MoE) is currently implementing the second phase of its Gender Mainstreaming Action Plan (2014-2020), which promotes gender mainstreaming in environmental planning, the placement of women in management positions, capacity building on gender and the environment, and resource mobilization for gender responsiveness in project strategic planning.

One of the goals of the National Forest Program 2010-2029 is to increase the participation of women in the FA at both national and local level, as well as to promote equal gender benefits. However, no specific measures on gender equality in forest management are integrated in the major objectives of the programme. Nevertheless, the Cambodian REDD+ program has embedded gender capacity building activities since 2016 in order to ensure equal participation and representation of women in forest management in Cambodia.

The Cambodia Climate Change Strategic Plan (CCCSP) 2014-2023 coordinated by MoE, has one of its goals to reduce gender vulnerability and risks caused by climate change and other environmental impacts.[27] One participant in developing the CCCSP action plan was the Ministry of Women Affairs (MoWA), which assured gender mainstreaming of the document.

A monitoring system will measure the progress towards gender sensitive targets. The target for 2020 was 10% of the areas within protected areas of agro- and forest ecosystems (including mangroves), should have improved restoration with enhanced ecosystems services, *particularly to women*, elders and children, as well as to indigenous minorities. It is focusing on improvement of climate change adaptation and disaster resilience, and the provision of water, food security, and other ecosystems services to the whole population of Cambodia. The two National Communication Reports to the UNFCCC (2002 and 2015) have, however, no reporting on gender issues.

Based on the Gender and Climate Change Action Plan (GCCAP) 2014–2018 and CCCSP 2014-2023 MoWa developed a “Gender and Climate Change Strategic Plan” (GCCSP). The plan defines strategies for gender inclusion in decision-making regarding climate change and natural resources management, including awareness-raising.

The GCCAP defines five priorities: (i) Integrate gender into climate adaptation and mitigation plans; (ii) Increase women’s decision-making power at all levels; (iii) Improve data on gender roles in climate change adaptation; (iv) Design gender indicators for a national monitoring and evaluation framework on climate change; and (v) Design gender-responsive climate change adaptation and mitigation projects.

Cambodia has also established ‘Gender Mainstreaming Action Groups’ (GMAG) and a ‘Gender and Climate Change Committee’ (GCCC) under MoWA, which are expected to come up with new ideas on both technical issues and administration/finance to climate change.

6.5 Recommendations for Land and Forest Restoration

6.5.1 Policies and Strategies

Cambodia has relevant laws and regulations that are supporting landscape restoration, including institutional arrangements in place. The top government leadership and the public have a strong will to support landscape restorations activities at the ground, however, national institutional capacity and budget allocations are not good enough to make the regulatory framework operative and effective in the long run.

[27] https://www.unwomen.org/sites/default/files/Headquarters/Attachments/Sections/Library/Publications/2019/A-74-224-Submission-Cambodia-en.pdf

International laws and regulations such as the Rio Conventions were ratified and adopted by the Royal Government of Cambodia, and the landscape restoration framework was developed on this basis. Important lessons learned have been achieved from projects implemented by ministries, NGOs, and international agencies, in terms of inter-institutional arrangements and public participation.

Formulation of the National Forest Programme 2010-2029 was based on the Forestry Law. However, the target for restoration is not reflected spatially, which should be carried out as soon as possible. The target for restoration may be unrealistic based on the situation on the ground, because there are still no integrated land use plans in the country to guide rehabilitation and estimating the targets for reforestation or restoration. There are very few landscape level plans with defined target for restoration, which is an area that needs government and international support.

The Sub-decree on Community Forestry Management (2003) should be revised to broaden its scope and to streamline and simplify its administrative procedures with the objective to considerably shorten the time for conclusion of community forestry agreements, and simplify management planning and approval procedures for the harvesting, marketing and transport of wood and NWFPs from approved community forest areas. Community development programs within ELCs should be incorporated in concession agreements and management plans, including the designation of community use zones for subsistence purposes, and allocating of qualified staff and funds for community development work.

Cambodia has advanced in its REDD+ agenda, achieving REDD readiness and therefore being ready for performance-based payments. REDD+ is a form of international payment for ecosystems services, where the formal structure is linked to the UNFCCC. To monitor progress on the REDD+ Action and Investment Plan, the M&E framework will: (i) provide information to coordinate action and management decisions; (ii) support accountability; (iii) enable learning; and (iv) enable evidence-based adaptive management REDD+ Taskforce Secretariat Cambodia 2020). The Government of Cambodia should use the current opportunity to initiate bilateral negotiations with the countries that are financing most of the REDD+ budget, especially Norway and Germany. Complementary, there is also a voluntary forest carbon market supported by companies, NGOs and others.

6.5.2 Field Implementation

Restoration initiatives in Cambodia should build on international experience. A variety of ecosystem management approaches are being promoted on global level for ecosystem repair, ranging from natural regeneration and improved management of forest plantations to active ecological restoration, e.g. Brancalion et al. (2019) and Gann et al. (2019), where the measures to be taken would depend on the land use goals. According to Gann et al. (l.c.), the highest ecological restoration goals would apply in areas where the main goal is biodiversity conservation, such as in endangered ecosystems. In these areas, recovery of species composition and ecosystem structure, functionality, and integrity over an area as large as possible is essential, potentially more important than enhancing ecosystem goods and services such as carbon storage or water regulation, given frequent trade-offs between biodiversity protection and carbon storage (Veldman et al., 2015).

Some general conclusions and lessons that could frame the land restoration and forestry development in Cambodia are:

- The Cambodia Civil Society Organizations REDD+ Network (CSO-REDD+ Network) is a network of about 25 civil society organizations and development partners who work on natural resources, REDD+ and forestry in Cambodia. The network serves as a bridge between government agencies and nongovernment institutions including conservation groups, academia, local communities, indigenous people and development partners. The network provides the platform for its members to make contribution to the national policies related to REDD+ since some of its members are also part of the National REDD+ Program Executive Board, the REDD+ Consultation Group, REDD+ Gender Group, and REDD+ Technical Teams.

- Sustainable forest production and management of both wood (timber and fuelwood), and non-wood forest products require enhancement of the capacity and participation of the rural communities.
- To reduce the pressure on natural forest ecosystems it is important to also investing in production forestry for the market. This includes improving the opportunities for PPPs and community-based forest enterprises.
- Community micro enterprises forms an important part of the private sector on local level. Forest communities should therefore receive support from the Government for local forestry production to develop improved livelihoods, e.g. technical assistance, market information and advisory, and value chain development for community forestry products, as well as design and establishment of financial incentives and mechanisms for community forestry investments.
- Certification of sustainable forest management with FSC accreditation is an efficient way to develop forest value chains and open up new markets. The FSC's certification of forests and chain of custody assures that environmental, social and financial sustainability is considered. Cambodia's experience from Grandis Timber (case 1) can function as a pilot for new forest certification initiatives in Cambodia.
- Community forestry must be based on clear tenure to land and natural resources. As mentioned under case study 2, capacity building and support to communities can give the local population improved understanding of the importance of forests for their livelihood, income generation (including NTFP) and the future of their children. In that way, the communities would be the best guardians of the forest.
- Communities should receive logistic, financial and material support to have more community forestry areas approved, to rehabilitate degraded forest or to protect good forest from exploitation. Existing collaborative management mechanisms should be strengthened and expanded to ensure that roles and responsibilities for sustainable management of production forests are shared and local concerns and priorities are reflected in decisions affecting the use of forest resources.
- Even though promotion of multipurpose native species is encouraged, this may not always convince the communities due to other characteristics and often longer harvesting cycles. In general, indigenous communities are most encouraged to conserve and use native species, due to their tradition and cosmovision. To convince other communities, field staff should not simply tell them that "native is better" but apply an approach of "the right tree in the right place for the right purpose".
- Another community-based opportunity is to integrate agroecological measures within specific types of farming systems, particularly in smallholder farmer regions and areas where farming is carried out on steep hills and degraded land, as well as for tree orchards.
- The areas classified as sustainable zones can be ideal to target for restoration. Areas closer to the center of the communities should be targeted for agroforestry since many of them have intensive cultivation. In forest farming, multi-purpose and high value trees should be planted in combination with agricultural cash crops and staple food sources of the communities.
- Women have a special role in community forestry due to their knowledge of multi-purpose uses of the forest species, for family use (firewood, food, medicines, etc) and products for sale. It is therefore important to assure gender mainstreaming of any local forestry project.
- An especially important area for restoration is the coastal region, due to high biodiversity on land and in the ocean and vulnerability to natural disasters (typhoons, tsunamis, flashfloods, beach erosion). As described under case study 3, an efficient measure is planting of mangroves that works as a protective buffer for the land, and can be combined with community-based ecosystems management and ecotourism.

- There are good opportunities to develop more protected wetland areas and Ramsar sites in the framework of integrated water resources management, including initiatives for improved wastewater treatment infrastructure and buffer zones around wetlands and reservoirs.
- Landscape restoration measures should normally be carried out within a river basin/ watershed planning approach, e.g. under the 2015 sub-decree on River Basin Planning. Watershed management is also an effective measure for disaster risk reduction.
- This review also detected an opportunity to build climate resilience of existing hard infrastructure investments by linking nature-based solutions (NbS) and landscape restoration measures.

Cohen-Shacham et al., 2019 mention that there may be opportunities to implement restoration activities based on Nature Based Solutions (NBS), in which restoration and sustainable land use practices effectively address other societal challenges, in line with the proposed land sharing strategy introduced by Phalan et al. (2011). Restoration has clearly the potential to target other services besides biodiversity conservation, by concentrating on particular forest/land restoration such as riparian areas, buffer zones around residual forest patches, corridors between forest areas and eroded areas on steep hills (Lamb et al., 2005), helping to achieve goals such as improving water quality, reducing sedimentation and increasing uptake (Holl and Aide, 2011).

Crouzeilles et al. (2017) carried out an analysis of forest restoration projects in the tropical regions of the world, which indicated that natural regeneration with following succession processes could often be the best solution to restore ecosystem functions and services. Brancalion et al. (2019) points out that natural regeneration normally has the lowest cost. Despite expenses for fencing and land management, the main cost for natural regeneration is the value of the land. Allocation of land for restoration depends on many issues, such as current land-use of the landscape around the area and connectivity of natural habitats. For the mentioned reasons, planning of land restoration should identify already existing natural remnants. Another important issue to consider in FLR is the degree of human threats, including facility of access to the area, which could mean the success or failure of natural regeneration.

A strong planning process with coherent goals is urgent, especially in some provinces along the Tonle sap Lake and Mekong River Basin with a poor history of land-use planning, and weak enforcement of government regulations on public and private land. One positive example is however found in Battambang Province, near the lake, which is a demonstration site for town developments that are resilient to climate change, as well as a model for development in Cambodia (URCSEA 2015).

6.6 Conclusions

Investments by industry participants or local smallholders into the forest resource can contribute to meet the national goals for industry development, sustainable supply of wood products, job creation and income generation for local communities, poverty alleviation, forest rehabilitation and environmental protection. Such investments could be facilitated through a comprehensive package of institutional and technical support mechanisms. Examples include securing long-term land tenure and security of access to land, trees, and forest products, a deregulation of bureaucratic obstacles and administrative charges along the local, national and international value chains of forest products, clear and transparent mechanisms for tax incentives, technical support services, and well-defined rules and practices of equitable benefit sharing for forest communities. Certification of sustainable forest management and chain of custody with FSC accreditation can be accessible to communities and SMEs if they certify together in large units and the government and/or international project financing could cover part of the cost.

Providing regular market information on supply, demand and market prices of wood and NWFPs to the forest industries sector, local FA offices involved in collecting forestry related revenues and forestry communities will ensure that stakeholders are aware of the value of their resources and provide an incentive to expand forest production and trade. The forests would however only be

competitive compared with agriculture and other short-term investments if the government assures a level playing field without most financial incentives for agriculture. Sustainable forestry should assure a combination of multiple income-generating activities, including certified wood and NTFP, carbon credits from REDD+, locally established PES agreements (often with a watershed approach), as well as ecotourism.

Providing opportunities for the direct participation by both men and women in sustainable production forests would reduce pressure on natural forests and offer increased livelihood alternatives for local communities. No commercial logging should be permitted in natural forests that are not FSC certified. New technologies should be promoted for multi-tiered land-use in agroforestry production systems, supporting financially viable options for the sustainable production and marketing of timber, wood fuel and NWFPs. The goal would be to provide financial and technical assistance for small business development and access to microcredit initiatives associated with processing and marketing of NWFPs, involving local communities in ecotourism programs in forest areas, and increasing community employment opportunities associated with ELCs.

In order to strengthen the institutional capacity of the FA and to consolidate its position, its mandate and resources should be strengthened as the appropriate technical authority to implement the National Production Forestry Strategy in close collaboration with other administrations of MAFF and MoE. Capacity development on forestry for the public sector should be based on a comprehensive assessment of training needs, which will facilitate the development of a departmental training plan for FA at central and local level, and the delivery of a tailored series of integrated training modules.

Active collaboration between line ministries and universities, national and international research institutions, NGOs, and development partners will be necessary to mobilize support for, and scale up, research efforts and best practices in the establishment and management of production and protection forests, and the documentation and dissemination of the results. This includes reviving the function of the Technical Working Group on Forest Reform and strengthening its role and local authority by providing the necessary technical and financial resources, and political support.

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Cambodia Landscape. Cardamon Mountains. (photo by Malena Stiteler).

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