



**KINGDOM OF CAMBODIA**

**NATION RELIGION KING**

# **Strategic Plan for Fisheries Conservation and Management 2020 - 2029**

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**Final Draft**



## Foreword

The Royal Government of Cambodia has taken significant policy measures addressing the protection, conservation and sustainable management of the rich natural resources of the Kingdom. Measures include conservation and management of the fisheries resources and the aquatic ecosystems on which they depend, and which provide for livelihoods, income and employment, and food security and nutrition of most Cambodian households, most importantly for those living in rural and semi-urban areas.

An early and ground breaking achievement for the effective conservation and management of the fisheries sector was the fisheries reform which cumulated in the 2012 “Deep Reform” and abolished all fishing lots. The reform encompassed the transfer of rights and responsibilities to fisheries communities to co-manage the fisheries resources in collaboration with the Fisheries Administration, under the legal provisions of the Sub-decree on Community Fisheries.

Another important milestone of sector management is the Strategic Planning Framework for Fisheries: 2010-2019 (SPF) which was fully adopted by the Royal Government of Cambodia. The SPF was integrated into the “Rectangular Strategy” for Growth, Employment, Equity and Efficiency Phase III (RS III) and the National Strategic Development Plan 2014-2018 (NSDP) and is fully aligned with the Agriculture Sector Strategic Development Plan (ASDP). The updated Strategic Planning Framework for Fisheries: 2015-2024 provides guidance to contribute to the Royal Government’s vision for the future, where the Cambodian people continue to benefit from abundant fisheries resources.

Recent measures to improve management and development of the sector and the conservation of fisheries resources include the formulation of a National Plan of Action to prevent deter and eliminate Illegal, Unreported and Unregulated (IUU) Fishing, the National Plan of Control and Inspection and the revision of the Fisheries Law.

The 10-year Strategic Plan for Fisheries Conservation and Management which I have the pleasure to introduce today continues these efforts and pursues a vision where “Cambodia’s fisheries resources and ecosystems are restored where depleted, conserved and protected, for livelihoods and food security and nutrition of present and future generations”. Its overall objective entails that “All stakeholders collaborate to ensure that Cambodia’s fisheries are utilized sustainably, conserved and managed in an environmentally non-degrading, ecologically appropriate, economically viable, and socially acceptable manner”.

The scope of the 10-year Strategic Plan for Fisheries Conservation and Management is “To protect, conserve and restore inland fisheries resources and their ecosystems, including of the Tonle Sap Great Lake and surrounding provinces, the sub-regions of the lower Mekong and Tonle Bassac and of the upper Mekong, as well as marine fisheries resources under national jurisdiction, in particular the coastal and near-shore marine environs”; for its long term scale it aligns with the Sustainable Development Goals (SDGs) and the Aichi targets formulated in the context of the UN Convention on Biological Diversity, and to which Cambodia is party. The Aichi targets postulate that “At least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially

areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes”.

This 10-year Strategic Plan for Fisheries Conservation and Management has been developed with the collaboration, commitment and effort of key stakeholders, including fishing communities, national and sub-national government institutions, and with support from national and international non-governmental organizations and development partners. On behalf of the Ministry of Agriculture, Forestry and Fisheries, I would like to acknowledge support of all stakeholders to developing this Strategy in an effective and timely manner, and look forward to their continued cooperation in its implementation.

Phnom Penh,

Ministry of Agriculture, Forestry and Fisheries

**Veng Sakhon**

## Acknowledgements

The 1<sup>st</sup> draft Strategic Plan for Fisheries Conservation and Management has integrated and restructured relevant elements of several important documents e.g. the SPF, the NPOA IUU, The National Plan for Control and Inspection, and the draft 5-year Management Plan for Fisheries Conservation. The formulation of the 1<sup>st</sup> Draft was supported by inputs from the Technical Working Group Fisheries and the Sub-Group of Conservation and Economics.

Further inputs and comments were provided by Conservation International, the [European Union](#), Fauna and Flora International, The Fisheries Action Coalition Team, the International Union for Conservation of Nature Marine Conservation Cambodia, the Swiss Agency for Development and Cooperation, Wildlife Conservation Society, WorldFish, and World Wildlife Fund; the valuable inputs of Vittoria Elliot deserve special acknowledgement.

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Valuable contributions from Senior Management of the FiA Departments for Fisheries Conservation, Fisheries Affairs, Community Fisheries Development and Aquaculture Development allowed advancing the Strategic Plan and are acknowledged with gratitude.

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## Abbreviations

|        |   |     |                             |
|--------|---|-----|-----------------------------|
| ASDP   | Agricultural Sector Strategic Development Plan                                  |     |                             |
| BFMS   | Basin-wide Fisheries Management and Development Strategy                        |     |                             |
| CBD    | Convention on Biological Diversity  |     |                             |
| CITES  | Convention on International Trade of Endangered Species of Wild Fauna and Flora |     |                             |
| CI     | Conservation International  |     |                             |
| CFi    | Community Fisheries   |     |                             |
| CFDD   | Community Fisheries Development Department                                      |     |                             |
| DP     | Development Partner   |     |                             |
| DAD    | Department of Aquaculture Development   |     |                             |
| DFA    | Department of Fisheries Affairs   |     |                             |
| DFC    | Department of Fisheries Conservation  |     |                             |
| EU     | European Union  |     |                             |
| EC     | European Commission   |     |                             |
| EAFM   | Ecosystem Approach to Fisheries Management                                      |     |                             |
| FACT   | Fisheries Action Coalition Team   |     |                             |
| FAO    | Food and Agriculture Organization   | FFI | Fauna & Flora International |
| FiA    | Fisheries Administration  |     |                             |
| FiAC   | Fisheries Administration Cantonment   |     |                             |
| GDP    | Gross Domestic Product  |     |                             |
| ICRI   | International Coral Reef Initiative   |     |                             |
| IFReDI | Inland Fisheries Research and Development Institute                             |     |                             |
| IUCN   | International Union for Conservation of Nature                                  |     |                             |
| IUU    | Illegal, Unreported and Unregistered fishing                                    |     |                             |
| KRA    | Koh Rong Archipelago  |     |                             |
| LMB    | Lower Mekong Basin  |     |                             |
| MAFF   | Ministry of Agriculture, Forestry and Fisheries                                 |     |                             |
| MCC    | Marine Conservation Cambodia  |     |                             |
| MFMA   | Marine Fisheries Management Area  |     |                             |
| MoE    | Ministry of Environment   |     |                             |
| M&E    | Monitoring and Evaluation   |     |                             |
| MPA    | Marine Protected Area   |     |                             |
| NESAP  | National Environment Strategy and Action Plan                                   |     |                             |

|          |  |
|----------|--|
| NGO      | Non-Governmental Organization  |
| NPOA IUU | National Plan of Action to combat IUU fishing  |
| NRW      | Natural Resource Management  |
| NSDP     | National Strategic Development Plan  |
| NGO      | Non Governmental Organization  |
| NPCI     | National Plan for Control and Inspection   |
| OECD/DAC | Organization for Economic Cooperation and Development/Development Assistance Committee |
| OVI      | Objectively Verifiable Indicators  |
| PESTLE   | Political, Economic, Social, Technical, Legal and Environmental (dimensions)           |
| PDAFF    | Provincial Department of Agriculture, Forestry and Fisheries                           |
| RGC      | Royal Government of Cambodia   |
| RC       | Rectangular Strategy   |
| RPOA     | Regional Plan of Action  |
| SEAFDEC  | Southeast Asian Fisheries Development Center   |
| SDC      | Swiss Agency for Development and Cooperation   |
| SDG      | Sustainable Development Goals  |
| SWOT     | Strengths, Weaknesses, Opportunities, Threats  |
| TGWFi    | Technical Working Group Fisheries  |
| UN       | United Nations   |
| UNCLOS   | United Nations Convention on the Law of the Sea  |
| WCS      | Wildlife Conservation Society  |
| WWF      | World Wildlife Fund  |



## Executive Summary

The scope of the 10-year Strategic Plan for Fisheries Conservation and Management is “To protect, conserve and restore inland fisheries resources and their ecosystems, including the Tonle Sap Great Lake and surrounding provinces, the sub-regions of the lower Mekong and Tonle Bassac and the upper Mekong, as well as marine fisheries resources under national jurisdiction, in particular the coastal and near-shore marine environs”. Its vision is “Cambodia’s fisheries resources and ecosystems are restored where depleted, conserved and protected, for livelihoods and food security and nutrition of present and future generations”.

The Strategic Plan is owned by the Fisheries Administration (FiA) of the Ministry of Agriculture, Forestry and Fisheries (MAFF). It has been developed with the collaboration, commitment and effort of key stakeholders, including fishing communities, national and sub-national government institutions, with support from national and international non-governmental organizations and development partners.

The Strategic Plan is formulated based on a situational analysis of political, economic, social, technical, legal and environmental (PESTLE) dimensions of conservation and management of aquatic resources and their ecosystems in Cambodia. The analysis found that (i) the sector policy framework enables effective and sustainable fisheries conservation and management, (ii) in spite of the crucial role the sector plays in the national economy and its pivotal role in providing for livelihoods, food security and nutrition, public underinvestment in fisheries conservation and management and continuing dependence of donor financing may result in dramatic economic and social costs to the country’s economy in the long term, (iii) there is considerable room for enhancing the comprehensive, responsible and informed participation of resource users in fisheries conservation and management, towards a shared “culture of compliance” with legal and regulatory provisions, (iv) in addition to over- and illegal fishing, the use of destructive fishing gear as bottom trawls, small mesh sizes and electric fishing are having disastrous impacts on aquatic ecosystems, stock abundance and diversity, (v) the legal framework (under revision) provides for sustainable fisheries resource management but that lack of enforcement of legal and regulatory provisions remains the central constraint to effective fisheries conservation and management.

The analysis concludes that, overall, inland and marine fisheries resources show clear indications of having reached limits of sustainable use. Principle root causes are human interventions in the environment and ecosystem, with over- and destructive fishing, loss of connectivity and pollution exacerbating negative impacts of climate change. Ultimately, limits and foreseeable declines in resource availability confronted by a steadily increasing population will jeopardize livelihoods, food security and nutrition the sector presently supports nationwide.

The analysis of strengths, weaknesses, opportunities and threats (SWOT) based on the results of the PESTLE assessment shows that weaknesses and threats outweigh strength and opportunities, providing ample justification and rationale for the interventions the Strategic Plans proposes. Both PESTLE and the SWOT analysis also suggest that their successful implementation will depend on

two crucial elements: political will to enforce compliance and availability of funds for the necessary logistic and budgetary support.

In order to structure the interventions, the Strategic Plan discusses strategic approaches to fisheries conservation and management for designated/proclaimed as areas under conservation, i.e. State and community fisheries conservation areas, marine fisheries refugia, and community fisheries refuges, and for critical habitats located in open access areas of the inland and marine fisheries domains not designated as conservation areas. For each, specific issues and challenges as well as lessons learned are discussed and conservation and management approaches are proposed, in quality and quantity, and strategic priorities and actions are cross tabulated for key habitats.

All the above provided the basis for a long term strategy to improve sector management, summarized in a “Theory of Change”. Under the policy vision proposed above, an overall objective is formulated as: “All stakeholders collaborate to conserve and manage Cambodia’s fisheries in an environmentally non-degrading, technically appropriate, economically viable, and socially acceptable manner”. The overall objective is operationalized in strategic objectives addressing inland fisheries and coastal and marine fisheries respectively i.e. “Inland fisheries ecosystems protected and managed effectively”, and “Coastal and marine fisheries ecosystems conserved and managed effectively”. Under each strategic objective two specific objectives are formulated separately for designated fisheries conservation areas i.e. “Fisheries conservation areas protected and managed effectively”, and for critical habitats under open access i.e. “Critical habitats under open access protected and managed effectively”. Finally, outcomes and outputs, together with objectively verifiable indicators (OVIs), sources of verification and risks and assumption are, tentatively, identified under each specific objective in an indicative logical framework.

In subsequent chapters the Strategic Plan proposes a phased implementation approach, discusses institutional arrangements including interagency collaboration, assesses present, mid-term and long term finance need i.e. the need for increased self-financing of conservation and management by communities, and outlines an approach to monitoring and evaluation in line with the Ministry of Agriculture, Forestry and Fisheries’ M&E procedures, and facilitating the formulation and implementation of the 5-year Management Plans of the involved FiA Departments.

## 1. Introduction

The Cambodian fishery sector is made up of the marine, coastal and inland fishery<sup>1</sup>, estimated to yield a total of about 600,000 tons of fish annually. Fisheries provide livelihoods to about 6.7 million people and fish is the second most important food source for Cambodians, after rice: The average annual supply of fish per capita is 52.4 kg, with fish accounting for up to 81.5% of total animal protein supply for some sections of the population. Economically, the value of exports alone has been estimated to be as high as US\$100 million per year, with the total fishery valued at about US\$1.25 billion, and providing 8-12% of the country's GDP in 2016<sup>2</sup>. Thus, the fisheries are an essential provider of food security and nutrition, public and private revenue, and livelihoods for the nation.

Both regional and national development is placing increasing pressure on fisheries resources, directly or indirectly, through habitat and ecosystem. Major threats are water development including hydropower dams, intensification of agriculture in the flood plains, land reclamation and sand dredging, and destruction of inundated forests and mangroves. Added to these threats, is a rapidly growing population increasing the pressure on the fish resources at all levels.

The Royal Government of Cambodia (RGC) is committed to sustainable management of natural resources, as manifested in the Rectangular Strategy Phase IV of the sixth legislature and the National Strategic Development Plan (NSDP), which aim to achieve an optimal “balance between development and conservation”, enhancing the contribution of natural resources to economic growth, socioeconomic wellbeing, food security, and nutrition, while safeguarding natural resources for present and future generations. Conservation and management of the country's fisheries resources, and maintaining the integrity of the aquatic ecosystems they depend on, are integral parts of this commitment and integrated into the Agricultural Sector Strategic Development Plan (ASDP).

The 10-Year Strategic Plan for Fisheries Conservation and Management presented in the following (hereafter the “Strategic Plan”), aims to provide a policy and planning framework for conservation and management of fisheries resources and aquatic ecosystems, for the period from 2019 to 2028. The process of developing the Strategic Plan is owned by the Fisheries Administration (FiA) of the Ministry of Agriculture, Forestry and Fisheries (MAFF), with the Department of Fisheries Conservation (DFC) spearheading its formulation. Its implementation will be a collaborative effort of the DFC and FiA's Departments of Fisheries Affairs (DFA), Community Fisheries Development CFDD and Aquaculture Development (DAD), and supported by the Inland Fisheries Research and Development Institute (IFReDI) and the Marine Fisheries Research Center. Implementation at provincial levels will be a collaborative effort of fishers, their communities and community based organizations, private sector operators and non-state actors and sub-national competent authorities e.g. FiA cantonments of PDAFFs and executive arms of RGC.

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<sup>1</sup> Cambodia's inland fisheries is considered the most intensive worldwide and the fourth largest overall after China, India, and Bangladesh.

<sup>2</sup> All data provided by FIA/DFC

The Strategic Plan follows a holistic approach to fisheries conservation and management, addressing inland and marine/coastal aquatic ecosystems in an integrative manner and beyond political boundaries. Its adoption will be complete, governing all operations in the fisheries sector. Implementation will be directed by the Fisheries Administration and will incorporate the co-management approach of Community Fisheries (CFis) already established in many fishing communities. Co-management arrangements include partnering communities/community fisheries with competent local authorities, with oversight provided by FiA under the legal and regulatory framework of the Fisheries Law, the Sub-Decree on Community Fisheries and other relevant sub-decrees.

At regional level the Strategic Plan aligns, for marine fisheries conservation and management, with corresponding efforts of Regional Fisheries Management Organizations such as, SEAFDEC, and, for transboundary inland fisheries conservation and management, with the Basin-wide Fisheries Management and Development Strategy of the Mekong River Commission. At international level the strategic plan aligns with the Sustainable Development Goals (SDGs) and the Aichi targets formulated in the context of the UN Convention on Biological Diversity, and to which Cambodia is party.

The Strategic Plan is a living document (rather than a fixed blue print) for fisheries conservation and management for the next ten year, following the vision, mission, objectives, scale and scope identified below. Its implementation will follow an adaptive management approach, monitoring and periodically evaluating progress, and adjusting operational planning accordingly. Implementation will be in two phases, with the implementation of the first phase following detailed 5-year management plans which will be formulated and budgeted by DFC, DFA, CFDD and DAD. The second phase will be implemented following a mid-term evaluation and adjustment of priority actions, timelines and budgets for the elaboration of phase-two 5-year management plans.

## 2. Strategic Framework

### 2.1 Vision

The **vision**<sup>3</sup> for the Strategic Plan is:

*Cambodia's fisheries resources and ecosystems are restored where depleted, protected and conserved for livelihoods and food security of present and future generations*<sup>4</sup>.

### 2.2 Mission

The **mission** of the Strategic Plan is proposed as:

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<sup>3</sup> The vision, as well as the overall objective were formulated during the fisheries conservation consultation workshop in Siem Reap on October 30, 2018.

<sup>4</sup> The vision aligns with the SPF 2010-2019's vision: "Management, conservation and development of sustainable fisheries resources to contribute to ensuring people's food security and to socioeconomic development in order to enhance people's livelihoods and the nation's prosperity", and with the IUCN vision of the Strategic Plan Framework for fisheries 2010-2019.

*To provide a strategic framework for sustainable fisheries through effective conservation and fisheries management and provide guidance to national and subnational competent authorities, CFIs and stakeholders to maintain, protect and restore inland, coastal and marine fisheries resources and their ecosystems.*

## 2.3 Overall Objective

The **overall objective** is:

*All stakeholders collaborate to ensure that Cambodia’s fisheries resources are utilized sustainably, conserved and managed in an environmentally non-degrading, ecologically appropriate, economically viable, and socially acceptable manner<sup>5</sup>.*

## 2.4 Scope and Scale

The **scope** of the Strategic Plan is:

*“To protect, conserve and restore inland fisheries resources and their ecosystems, including the Tonle Sap Great Lake and surrounding provinces, the sub-regions of the lower Mekong and Tonle Bassac and the upper Mekong, as well as marine fisheries resources under national jurisdiction, in particular the coastal and near-shore marine environs.”*

The **scale** of the Strategic Plan aligns with the Sustainable Development Goals (SDGs) and the Aichi targets formulated in the context of the UN Convention on Biological Diversity (CBD), and to which Cambodia is party. The Aichi targets request, under Strategic Objective C, Target 11: “By 2020, at least 17<sup>6</sup> per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes”.

With regards to coastal and marine conservation the Sustainable Development Goals (SDGs), to which the RGC has committed on a voluntary basis<sup>7</sup>, reiterated the Aichi target “By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information”<sup>8</sup> in SDG 14 “Conserve and sustainably use the oceans”<sup>9</sup>.

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<sup>5</sup> The draft 5-year management plan proposes the following objective: “Fisheries resources and ecosystem of the fisheries conservation areas are improved to ensure sustainable use and development of fisheries resources aimed at contributing to poverty reduction and promotion of Cambodian people’s living standard”.

<sup>6</sup> Historical data shown in Baran, Eric, *Cambodian Inland Fisheries: Facts, Figures and Content*, WorldFish Center and Inland Fisheries Research and Development Institute, Phnom Penh 2015 give some 15,000 km<sup>2</sup> for the Tonle Sap great Lake area and 20,000 km<sup>2</sup> for the Mekong wetland areas as of the end of the last century.

<sup>7</sup> RGC has formulated “localized” Cambodian SDGs (CSDGs), to be included in the NSDP 2019-2023. With respect to fisheries conservation they set the target of more than doubling the area of surface fish sanctuaries from 264,500 to 580,800 ha (CMDG 7.8).

<sup>8</sup> ADB (5712-REG Coastal and Marine Environment Management in the South China Sea, II; and MoE, *State of the Coastal Environment and Socio-Economy in Cambodia*, Phnom Penh, 2005 put the extent of the “claimed EEZ” of Cambodia at 42,000 km<sup>2</sup> (from Rizvi, A.R. and Singer, U. (2011), *Cambodia Coastal Situation Analysis*, Gland, Switzerland: IUCN)

<sup>9</sup> The issue of establishing respective baselines is taken up in Chapter 8. Monitoring and evaluation.

The Strategic Plan addresses these targets with the understanding that the timelines of targets are out-dated and that the actual year to year scale of achievements will, ultimately, be a function of political will and availability of funds<sup>10</sup>.

## 2.5 Guiding Principles

The Strategic Plan is based on the following policy principles<sup>11</sup>:

- Promote sustainable development and equitable growth, balancing environmental sustainability, social inclusion, resilience and economic growth;
- Foster improved sector governance to facilitate compliance with and enforcement of legal and regulatory provisions of fisheries conservation and management;
- Encourage stakeholder participation and ownership by ensuring transparent planning processes and accountability;
- Promote cross-sector and interagency coordination for the implementation of the Strategic Plan;
- Cooperate with neighboring countries to address transboundary challenges and issues of fisheries conservation and management, in particular of maintaining critical levels of and mitigating impacts on connectivity within and between ecosystems of the Lower Mekong Basin.
- Apply an ecosystem-based approach to fisheries conservation and management, implementing the Strategic Plan holistically across political borders;
- Follow an evidence based, adaptive management approach based on the best available information, but
- Do not delay fisheries conservation and management efforts because of lack of information and uncertainty following the precautionary approach as laid out in FAO's Code of Conduct for Responsible Fisheries.

## 3. Strategic Analyses

The Strategic Plan is formulated based on a situational analysis of political, economic, social, technical, legal and environmental (PESTLE) dimensions of conservation and management of aquatic resources and their ecosystems in Cambodia, and identifies and addresses issues and challenges of fisheries conservation and management on the basis of an analysis of strengths, weaknesses, opportunities and threats (SWOT).

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<sup>10</sup> The adaptive management of the Strategic Plan will closely follow the process of updating SDGs and Aichi targets by 2020.

<sup>11</sup> Adopted for fisheries conservation from the 10 principles of the SPF i.e. 1. Building resilience through adaptive planning; 2. Being evidence-based, accountable and transparent; 3. Operating at multiple levels; 4. Addressing conflicting aims and ensuring institutional coherence; 5. Ensuring the viability and sustainability of ecosystem function; 6. Enhancing the legal rights and responsibilities of communities and individuals; 7. Addressing the needs, aspirations and preferences of the communities; 8. Understanding dependency in the sector and balancing exclusion with livelihood alternatives; 9. Addressing costs and benefits in sustainable and equitable ways; 10. Building capacity.

### 3.1 Policy context

At national level the Strategic Plan supports and complements the implementation of Cambodia's broader development plans, including the following national policies and strategies:

- The Rectangular Strategy (RS) Phase IV 2013-2018
- The National Strategic Development Plan (NSDP) 2019-2023
- The Strategic Plan for Gender Equality and Women's Empowerment
- The National Policy on Green Growth and Green Growth Strategic Plan 2013-2030
- The Cambodia Climate Change Strategic Plan 2014-2023
- The National Biodiversity Strategy and Action Plan 2016-2020;
- The National Protected Area Strategic Management Plan 2016-2030;
- The National REDD+ Strategy 2017-2026

The RS and the NSDP identify, together with the national goals of *inter alia* socioeconomic development, good governance and poverty alleviation, the protection of aquatic ecosystems and conservation of biodiversity as instrumental for achieving sustainable fisheries resource conservation and development.

The Strategic Plan for Gender Equality and Women's Empowerment, launched in December 2014, instills stronger gender relevance in all dimensions of socioeconomic development in Cambodia. For the fisheries sector, a five year (2016-2020) Action Plan Promoting Gender Equality and Elimination of the Worst Kinds of Child Labour is expected to contribute to the success of gender mainstreaming and childhood protection in the sector.

The Green Growth and Green Growth Strategic Plan 2013-2030 provides a long term development perspective including Cambodia becoming a middle income country by 2030. Its aims include "(2) to ensure environmental sustainability, (4) to protect Cambodia's natural heritages full of biodiversity, and (5) to ensure that land and natural resources are used in an efficient manner to support sustainable and equitable socio-economic development for all Cambodian citizens".

The Climate Change Strategic Plan underlines the vulnerability of both the fisheries and communities which depend on fisheries and the need to build the resilience of the sector, and postulates adaptive planning processes to respond to climate change induced environmental threats.

The National Biodiversity Strategic Action Plan builds on the CBD and the National Environment Strategy and Action Plan (NESAP) which align with the RS and the NSDP. Both Plans intend to improve environmental governance and guide private sector and civil society to mainstream environmental considerations. The NESAP is complemented by the National Environmental Code, which focuses on the establishment of a strengthened legal framework for environmental protection.

Fisheries conservation and management is integrated into the Agricultural Sector Strategic Development Plan (ASDP) under Programme 3, "Fisheries Production and Reform". with the priority actions of protection and preservation of fisheries resources including, "continue to manage

all fisheries conservation areas, both in open-access areas and in areas of fishing communities, and of fisheries domain management” and “strengthen collaboration with local authorities at all levels to prevent intrusion into fisheries areas and destruction of flooded forest and mangrove forests”. The ASDP, as the NSDP and the RS, is presently being revised for the period from 2019 to 2023.

At sector level, the central policy document is constituted by the Strategic Planning Framework (SPF) for Fisheries 2015-2024 which builds on the Fisheries Deep Reform of 2012<sup>12</sup>. The SPF was adopted by the RGC and is integrated into the RS IV and the NSDP. The SPF has four pillars i.e. Pillar 1: Capture fisheries and management, Pillar 2: Aquaculture: inland and marine, Pillar 3: Fisheries value chain, and Pillar 4: Regulatory and services. Fisheries conservation is subsumed under Pillar 1; its respective most paramount element is that present levels of capture fisheries production cannot be increased sustainably and that the strategic priority for the foreseeable future are mitigating adverse impacts and shocks on the environment, with aquaculture the chosen production alternatives.

Other policy documents include the “National Action Plan for Coral Reef and Sea grass Management in Cambodia”, and the Sub-Decrees on Community Fisheries and the Sub-Decree on Identification of Endangered Fisheries Resources i.e. legal and regulatory provisions with policy implication (see 3.5 below).

At regional level, Cambodia was instrumental in the consultative process which led to developing the Mekong Basin-wide Fisheries Management and Development Strategy (BFMS), under the Basin Development Strategy of Mekong River Commission. The BFMS addresses regional and transboundary issues and challenges of inland fisheries conservation and management with the goal of “Responsible and sustainable use of living aquatic resources”. With regards to marine conservation and management Cambodia is actively and responsibly participating in regional policies fostered by Regional Fisheries Management Organization e.g. the Regional Plan of Action to Promote Responsible Fishing Practices including combatting Illegal, Unreported, and Unregulated Fishing (RPOA) of the Southeast Asian Fisheries Development Center (SEAFDEC).

Recently, Cambodia has joined the SEAFDEC led effort to establish a regional network of marine fisheries refugia. In Cambodia, spatially and geographically defined refugias have been identified for blue swimming crab, juvenile grouper and Indo-Pacific mackerel, in Kep, Kampot and Koh Kong respectively.

At international level, Cambodia is signatory or party to an array of international agendas, laws, agreements and covenants, which are relevant for fisheries conservation and management and the conservation of the aquatic environment under national jurisdiction. Of particular relevance is the Convention on Biodiversity (CBD) and the Aichi targets formulated in the context of the CBD, as well as the normative framework of the Sustainable Development Goals (SDGs). Both the Aichi targets and the SDGs attempt to balance the three dimensions of sustainable development i.e. environmental sustainability, social inclusion and economic growth, and entail important provisions for fisheries conservation, including quantified and time-bound objectives, as quoted in 2.4. above.

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<sup>12</sup> 158 Fishing lots with 953,861 ha were abolished and 856.358 ha (89.77%) were reserved for Community Fisheries (Use and conservation) and 97,503 ha (10.23%) were reserved for the fisheries conservation.



Other international agreements relevant to fishery conservation by which Cambodia is bound include:

- The Convention on the International Trade in Endangered Species of Wild Flora and Fauna (CITES)<sup>13</sup>;
- The Kyoto Protocol, United Nations Framework Convention on Climate Change;
- The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal;
- The Montreal Protocol on Substances That Deplete the Ozone Layer;
- The Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar)<sup>14</sup>;
- The International Convention for the Prevention of Pollution from Ships (MARPOL);
- The International Union for Conservation of Nature (IUCN);
- The United Nations Convention on the Law of the Sea (UNCLOS) to which Cambodia is a signatory but which has not been ratified
- The International Coral Reef Initiative (ICRI).

The RGC has embraced voluntary instruments as the FAO Code of Conduct for responsible Fisheries including important provisions as the International Plans of Action to manage fishing capacity and to fight Illegal, Unreported and Unregulated (IUU) fishing, as well as the Voluntary Guidelines on Securing Sustainable Small-scale Fisheries.

**In summary**, the policy context discussed above shows a comprehensive array of policies and strategies which either implicitly or explicitly address fisheries conservation and management. Further important elements as a revised Fisheries Law and national plans for fisheries control and inspection and for fighting illegal fishing have been or are in the process of being developed. The Strategic Plan takes into consideration the existing policy context and aligns with the Fishery Law. As noted above, the Strategic Plan is dynamic and thus will be adapted to align with future changes to any of the above policies and strategies.

While the policy framework clearly enables effective and sustainable fisheries conservation and management, implementation will, as pointed out above, depend on two crucial elements: political will and availability of funds. Regarding the former, fisheries conservation and management may face similar obstacles that have frustrated the sustainable management of Cambodia's forests: enabling policies and commitments exist at central level but are, frequently circumvented in practice at local levels. Limited resources and, in some cases a lack of will from local authorities, to enforce legislation, implement protective action, and contribute to effective management, leaves the interests of the local communities unprotected.

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<sup>13</sup> CITES, to which Cambodia has been a contracting party since 1997, aims to ensure that "International trade in wild fauna and flora will not threaten the survival of the species in the wild" and directly refers to protection and management of resources, the protection of endangered species, in addition to controlling their trade".

<sup>14</sup> Cambodia's accession to the Ramsar Convention dates back to 1999. It takes into account the ecological functions of wetlands, in particular as habitats critical to flora and fauna and applies inter alia to the conservation and management of mangrove forests.

## 3.2 Economic context

The fisheries sector contributes significantly to Cambodian national economy. Data from the FiA quoted in the draft National Plan for Control and Inspection (NPCI) show that total capture fisheries production of fish and fishery products (including aquaculture) was around 800,000 tons in 2016, valued at about US\$1.25 billion, and providing 8-10% to the country's GDP. The value of fish exports has been estimated to be as high as US\$100 million per year. In addition to the official exports, a substantial part of marine landings, mainly high-value finfish, shrimp and squids, enter markets in Thailand and Viet Nam unofficially.

The bulk of the landings are coming from inland fisheries, with the Tonle Sap Great Lake alone providing some 500,000 tons per year. There is at least anecdotal evidence that inland fisheries may be underreported because landings from dispersed fishing grounds e.g. the distant Mekong tributaries which do not enter markets via monetary exchange are not or only marginally recorded.

The marine component of the fisheries sector contributes about 14-16% of the total fisheries production, increasing from some 36,000 tons in 2000 to more than 120,000 tons in 2016. The draft NPCI (see above) suggests that small-scale landings, especially landings from "family fishing" may be under-reported and the total marine production could be over 200,000 tons.

Aquaculture production was at slightly more than 200,000 tons according to FiA data.

In spite of the significant contribution of the sector to the national economy and to food security and nutrition, RGC budget provisions for sector management do not reflect its socio-economic importance. This may be explained, partly, by the relatively marginal public revenues the sector generates. Most small scale and artisanal activities are part of the informal sector, not generating public revenues from taxes and tariffs. Larger scale operators, mostly engaged in illegal and destructive fishing, often ignore their fiscal obligations.

**In summary**, public underinvestment in fisheries conservation and management outside the portfolio of the FiA and dependence of donor financing may result in dramatic economic and social costs to the country's economy in the long term. Underfinancing of sector management poses a threat to the continuing contribution of the sector to food security and nutrition, and is further exacerbated by mainstream economic strategies which have actual or potential negative impacts on fisheries, like single crop agro industries and hydropower development which are promoted and for which investments are encouraged. A 2012 study on the impact of planned hydropower and multipurpose dams on total protein intake of Cambodians estimates a respective loss at 60% under a scenario of 11 mainstream dams (9 in Laos and 2 in Cambodia), and 100% under a scenario of an additional 77 tributary dams<sup>15</sup>. The study concluded that under the second scenario, "Cambodia would need to turn into a net importer in the medium term (with) seemingly insurmountable costs born against the loss of a productive fishery" (with) "seemingly insurmountable costs born against the loss of a productive fishery".

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<sup>15</sup> Orr et al. (2012) "Dams on the Mekong River: Loss of fish Protein and their Implications for land and water resources". Journal of Global Environmental Change., quoted in B. Eyles, C. Weatherby "Toward a sustainable Water-Energy-Food Future in Cambodia, The Stimpson Center 2018.

It is hoped that the Strategic Plan, in combination of recent efforts such as the development of the NPOA IUU fishing, the revision of the Fisheries Law and the formulation of the NPCI will increase awareness of the economic importance of the sector and increase sector management financing including by improving fiscal regimes.

### 3.3 Social aspects

In spite of urbanization and emerging secondary and tertiary sectors of the economy, Cambodians still depend directly or indirectly on fisheries, for their livelihoods, both as a source of income and employment, and for food security and nutrition<sup>16</sup>. Benefits accrue in particular to rising rural low income populations where almost all families with access to fishing grounds engage in fishing at least part time or occasionally. However, socio-political representation of small scale and artisanal fishers and their communities, including of CFis, is still little if at all developed, in spite of the long term engagement of donors and NGOs. This can be attributed *inter alia* to the general passive disposition to and acceptance of a social hierarchy determined by patronages, and low levels of social cohesion which obstruct stronger community institutions. Low levels of social organization are perpetuated by endemic social problems as youth criminality and domestic violence, fuelled by alcohol and drug consumption.

Low levels of organization and socio-political representation leave a political-economic vacuum favouring vested interests, cronyism and networks which consider natural resources, including fisheries resources, as sources of short term economic and political gain and in disregard of legal and regulatory provisions. This further undermines participatory processes and, thereby, good sector management and impede the ability of community based organizations as CFis to sustainably use resources they have been given access to and protect aquatic ecosystems effectively.

**In summary**, and in line with lessons learned in and beyond Cambodia which show that sustainable resource management imposed “from above” is likely to fail without responsible and informed involvement of resource users. There are no comprehensive, participatory and empirical studies on potentials and constrains of community based and co-managed “bottom up”, consensus based and collectively observed fisheries conservation and management policies. However, at least anecdotal evidence e.g. the low levels of social cohesion noted above suggest that considerable efforts towards a shared “culture of compliance” are still very much needed for fisheries management to be effective. Furthermore, raising awareness of the communal benefits of conservation actions and effective management are key factors for increasing voluntary compliance. Socializing the conservation strategy and educating communities in the benefits of its implementation is therefore essential.

### 3.4 Technological considerations

Technological dimensions relevant to fisheries conservation and management are particularly related to destructive fishing gear. Overcapacity i.e. causing fish mortality beyond the recruitment

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<sup>16</sup> Fish provide for protein, fatty acids, and essential vitamins and minerals essential vitamins and minerals needed to support human health, especially of pregnant women and children. On average the annual fish consumption is 52,4 kg per capita, a large part of which is prohoc, an artisanally made fish paste which is accessible to all sections of Cambodian consumers, including the very poor.

capacity of fish stocks result in overfishing by all segments of the fishing fleet including those vessels using destructive gear. Recent trends show that especially larger vessels more often than not resort to the use of efficient active but environmentally destructive gear, such as bottom trawls (including those with nets with pulse/electric gear), push nets and encircling nets (e.g. purse seines). While the increase in the number of small-scale and artisanal fishers using family-scale passive fishing gear can also result in overexploitation of resources, larger semi-industrial vessels using active gear are the principle cause of over-harvest, as well as causing damage to the aquatic ecosystems which drive and sustain stock abundance and diversity.

Threats to the inland fishery include the use of trawls that use small mesh sizes to target small minnow species that also capture other species of small size (i.e. immature juveniles). These small-mesh trawls are destructive to the habitat and have profound effects on annual recruitment. Other threats are the wide spread use by many small-scale fishers of “mosquito nets” and of car battery-based “electro-fishing”. These gears are of low cost and, therefore, widely accessible and easily replaced

There have been technological or technical developments that can facilitate effectiveness and efficiency of resource protection. Devices such as cement structures (so called fish boxes) which obstruct bottom trawling for example, and the potential use of drones for monitoring and surveillance, in particular of larger conservation areas and critical habitats could be beneficial to improve efficiency and effectiveness and facilitate regulatory enforcement.

**In summary**, it is evident that the principle threat to resource sustainability from within the fishery is brought about by the use of highly effective and efficient fishing gear. In inland waters, eliminating the use of car batteries for electric fishing and fine mesh gears is an unachievable endeavor, due to the ease of their attainment, thus hampering the effectiveness of confiscation efforts. In coastal and marine waters, fisheries conservation and management becomes futile due to the unabated use of active gear operated by larger higher-powered vessels, principally bottom trawls.<sup>17</sup>

Although there is a widespread acknowledgement of the disastrous impacts of bottom trawling and other destructive gear to aquatic ecosystems, stock abundance and diversity, there appears little political will, at least on sub-national levels, and resources to limit or prohibit the use of destructive gear. Considering this impasse, the deployment of obstruction devices such as, fish boxes appears to be the only way to effectively and efficiently deter destructive gear at the time of this writing.

### 3.5 Legal and regulatory provisions

The centerpiece of the legal and regulatory framework which governs the fisheries sector is the Law on Fisheries which was promulgated in 2006. The Law specifies the sovereign right of RGC over the sector: “The fishery domains are state property to the extent of the outer limit of the territorial sea. From that point on to the outer limit of the exclusive economic zone, the Kingdom of

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<sup>17</sup> Many observers and researchers of marine fisheries, in Cambodia and neighbouring countries as Thailand and Viet Nam, have concluded that without severely curtailing bottom trawling in all of the Gulf of Thailand, fish stocks will collapse in the first half of the next decade, together with the ecosystems they depend on.

Cambodia exercises sovereign rights in accordance with international law. (The boundary of the fishery domains shall be defined by sub-decree).”

The Law is presently under revision<sup>18</sup>, *inter alia* to respond to the issuance of the “Red Card” and EU demands with respect legal provisions addressing Cambodia’s obligations as a flag state<sup>19</sup>.

The objectives of the Law are to govern fisheries development and management i.e. “Sustainable Fisheries Management” in Chapter 4, with Article 10 and 11 defining, respectively, the inland and marine fisheries domains and fishing areas and the fisheries conservation areas. The latter are further identified, in Article 12, as sea grass areas, coral reef areas, flood plain areas in the wet season, inundated forest and mangrove forest areas.

In Chapter 5 the Law addresses “Fisheries Protection and Conservation”, providing scope of habitats to be protected: “...rapids and deep pools located in rivers, Tonle Sap Great Lake, lakes, inundated forests, group of islands, sea grass areas, coral reef area, and mangrove forests which are of importance for the sustainability of fishery resources shall be classified as Protected and Conservation Areas of Fishery Resources”. The Chapter further provides regulations for resource and ecosystem use management such as gear prohibition, trade in endangered species, dumping of waste etc.

The Law , in Chapter 6 “Management of Mangroves and Inundated Forest”, details provisions for use and management of these critical habitats, which shall be “protected for planting or conserving for forest regeneration to balance the fishery eco-system and prohibiting cutting, reclaiming, digging out, clearing, burning, or occupying flooded forests and mangroves”.

Article 12 emphasizes “All types of fishing areas, fisheries conservation areas, coral reefs, flooded areas in the wet season, and Inundated forest and mangrove forest areas as defined in Article 10 and 11 of this law are Fisheries Management Areas”.

The Law, in Article 15, also postulates the development of a National Fisheries Management Plan by the FiA<sup>20</sup>, “in consultation with relevant ministries, agencies, institutions, subnational authorities, local communities and community fisheries”. For guidance, the Plan is to follow the principles listed in Article 1 A of the Law of which the following directly address fisheries conservation:

- “long-term sustainable use, conservation and management of fisheries resources and habitat, and adoption and implementation of management measures in such a manner as to ensure that the fisheries resources and habitat are not overexploited, threatened or endangered;
- ensure that biodiversity and genetic diversity in the aquatic environment is maintained and enhanced;

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<sup>18</sup> The chapter quotes the version of the Law available at the time of its writing

<sup>19</sup> Issued by EC to third countries not-cooperating in fighting IUU fishing in accordance with Regulation (EC) No 1005/2008 and imply interdiction of exports of fish and fisheries products to the EU

<sup>20</sup> The SPF 2015-2024 p. 14 states, misleadingly, that the outcomes of the 11 sub-programmes of the fisheries sector of the ASDP fisheries programme represent the National Fisheries Management Plan.

- implementation and enforcement of conservation and management measures through effective monitoring, control and surveillance;
- prevention or elimination of overfishing and excess capacity and managing levels of fishing effort so they do not exceed levels commensurate with sustainable use of fisheries resources”.

The Law requests FiA to “review and modify the National Fisheries Management Plan every five years or at any earlier time, if required, to adapt the Plan to the ever-changing conditions and circumstances of the fisheries sector”.

Other legal provisions relevant for fisheries conservation and management include the “Royal and Sub-Decree on Establishment and Management of CFI”, and the Sub-Decree on Identification of Endangered Fisheries Resources.

**In summary**, the review of the legal and regulatory framework relevant to fisheries conservation and management show an array of provisions giving justification and legal basis to measures to protect and restore ecosystems which constitute the fisheries environment. Existing weaknesses will be addressed in the course of the on-going revision of the Law including legal procedures for solving offenses and penalties (Chapters 14 and 15). The central constraint to effective fisheries conservation has been and largely still is lack of enforcement of legal and regulatory provisions for which the following root causes are believed to be responsible:

- Lack of political will to enforce provisions by prosecuting offenders, in particular at local levels, rooted in local patronages and cronyism which are widely accepted as “facts of life”. There is also fear of retribution both on the part of local authorities if they clamp down on illegal activities by patronages;
- Imperfect governance<sup>21</sup> which discourages “bottom up” initiatives to fend off perpetrators;
- The lack of logistics i.e. trained staff, equipment and operational budgets on the part of executive agencies including Cantonment Inspection Departments.

### 3.6 Environmental context

Cambodia’s capture fisheries sector is dominated by the inland fishery but also includes a highly diverse and productive coastal and marine sub sector.

Inland waters are part of the transnational Lower Mekong Basin (LMB), which accounts for a capture fishery production that is higher than in any comparable geographical area of the world. The LMB is an ecosystem made up of many subsystems, with the Mekong, its tributaries and low-lying habitats like floodplains, rivers, wetlands, swamps and the Mekong Delta in Viet Nam essential for maintaining the system dynamics. A significant driver of the fishery in Cambodia is the existence of an annual ‘pulse’ of water, brought about by a seasonal monsoon that expands the rivers and lakes into a vastly productive wetlands and extensive floodplains. In addition to providing for abundance, these habitats support high levels of biodiversity in Cambodia’s inland

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<sup>21</sup> The normative framework of the SDGs, to which the RGC has committed, postulates in SDG 16 “Inclusive societies and access to justice for all”, target 16.3 Promote the rule of law at the national and international levels and ensure equal access to justice for all, target 16.5 Substantially reduce corruption and bribery in all their forms, target 16.6 Develop effective, accountable and transparent institutions at all levels, and target 16.7 Ensure responsive, inclusive, participatory and representative decision-making at all levels.

waters include more than 500 fish species and many other aquatic organisms, such as insects, snails, shrimp, crabs and other invertebrates, reptiles and mammals.

The inland fishery is highly dependent on up- and downstream connectivity of aquatic ecosystems in Cambodia and across the borders of LMB countries. Access to both critical spawning grounds in gravel beds and rocky pools, and nursing and feeding grounds in the seasonally inundated areas, particularly the floodplain forest around the Tonle Sap Great Lake, are essential for maintaining the productivity of the inland fishery. Maintaining the integrity of the floodplain ecosystems including flooded forest, grasslands, rice-fields, perennial water bodies and dry season refuges is therefore critical to sustaining the inland fishery<sup>22</sup>.

Coastal and marine capture fisheries are highly dependent, in terms of stock abundance and diversity, on critical habitats i.e. mangrove forests, corals reefs, sea grass beds, mudflats and intertidal zones. Critical habitats provide spawning and nursery grounds, feeding and shelter for finfish, and invertebrates such as crustaceans, shell fish, squid and crabs, as well as supporting visiting marine mammals. A significant number of inland and marine species presently considered endangered (see Annex 3).

Pressure on and threats to fisheries resources and their environs are both internal and external. The most important external threat to inland fisheries is the development of hydropower dams in Lao PDR and similar developments in Cambodia, including damming tributaries for irrigation and other purposes. Dams directly impede fish migrations, as well as reducing water flows and reducing sediment transport<sup>23</sup>.

The most important internal i.e. domestic threat to inland fisheries resources and ecosystems is the destruction of floodplain habitats by the progressive encroachment and clearing of flooded forests, scrublands and wetlands for agriculture, by both smallholders and medium- and large-scale operators. Encroachment facilitated by climate change induced floods, droughts and wildfires, with the latter directly related to weak governance<sup>24</sup>.

Other internal threats include the development of irrigation e.g. for high yielding rice varieties and agro-industries, which result in loss of floodplain habitats and rising levels of pollution from pesticide and fertilizer run-off. Spreading human settlements producing and dumping rising amounts of domestic waste, including plastic are also an increasing threat. Exacerbating this is

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<sup>22</sup> A 2018 workshop on Needs, Techniques, and Risk Assessment: Toward a Vision for Migratory Fish in Cambodia postulated, as a “priority action”: “Keep the Sekong-Mekong-Tonle Sap corridor free-flowing”.

<sup>23</sup> The Stimson’s Mekong Policy Project estimates that the original connectivity of Cambodia’s Mekong/Tonle Sap river system has already been reduced by 31% and that the “improper siting of dams on Cambodia’s tributaries would reduce connectivity by more than 60%. This, together with the Stung Treng and the Sambor dams, would effectively impede migration to “most of the Mekong system”.

<sup>24</sup> The 2017 report on conservation and rehabilitation of flooded forest in the Tonle Sap Biosphere Reserve states that “the prevailing fire regime is clearly man-made, related to the agricultural cycle, and progresses towards the lakeside areas from the peripheral agricultural areas as the floodplain dries out. It constitutes an unmanaged risk to the integrity of the remaining flooded forest (Ashwell, D.A., 2017 Conservation & Rehabilitation of Flooded Forest in the Tonle Sap Biosphere Reserve).

increasing fishing pressure, which has grown continuously over the last decade and which includes destructive fishing and fishing targeting small species and juveniles for aquaculture feed<sup>25</sup>.

External threats to the marine fisheries result from unabated IUU fishing which not only deplete resources but also impact the marine and coastal ecosystem integrity. Using destructive gear such as bottom trawls, pair trawls and electrified gear affects the marine environment, in particular by destroying sea grass beds and coral reefs and disrupting their connectivity.

Marine and coastal fisheries are, internally, threatened by unchecked overcapacity of the domestic fleet leading to overfishing and IUU fishing including by using gear highly destructive to the coastal and marine environment. Most vulnerable are critical habitats, such as sea grass beds and coral reefs facing depletion and reduced rehabilitation capacity, and because of disruption of their connectivity. Another threat come from the encroachment of coastal habitats critical for stock recruitment as mangroves e.g. by the agriculture and land grabbing, urbanization and the unchecked development of mass tourism. Regarding the latter, and contrary to eco-tourism, development of mass tourism constitute an imminent threat to the environment, as increasingly shown in the coastal provinces of Koh Kong and Kampong Som.

**In summary**, the threats outlined above impact both food security and livelihoods of all the people of the LMB, in particular those pertaining to the most vulnerable sections of society which lack assets to resort to alternative livelihoods and sources of protein. Overall, inland and marine fisheries resources show clear indications of having reached limits of sustainable use, with human interventions in the environment and ecosystem, with destructive fishing, loss of connectivity and pollution, being principle factors. Limits and foreseeable declines in resource availability will be confronted by a steadily increasing population of, in Cambodia, predominantly rural dwellers.

### 3.7 SWOT

From the PESTLE analysis above a summary analysis of strengths, weaknesses, opportunities and threats (SWOT) to conservation and management of aquatic ecosystems in Cambodia is derived. The analysis encompasses conservation and management issues and challenges because of their interdependence and inter-linkages.

*Table 1: SWOT analysis for the conversation and management of aquatic ecosystems in Cambodia*

| Strengths  | Weaknesses  |
|--|---|
| <ul style="list-style-type: none"> <li>• The sector policy framework enables effective and sustainable fisheries conservation and management.</li> <li>• Legal and regulatory provisions enable fisheries conservation and management and are in the process of being further improved.</li> <li>• Strong policy commitments to sustainable fisheries</li> </ul> | <ul style="list-style-type: none"> <li>• Limited human, financial and logistic resources for surveillance and enforcement of the legal and regulatory provisions developed to protect fishery resources and aquatic ecosystems at all levels.</li> <li>• Institutional “separation of power” and</li> </ul> |

<sup>25</sup> A report on inland fisheries of 2002 still concluded: “The main potential threat to aquatic resources and habitats is not over-fishing but interventions in upstream countries that alter the hydrological cycle of the River Mekong and the annual flooding pattern which is the “life blood” of the fishery” (EC Identification Mission, Support to the Fisheries Sector in Cambodia, N° 2002/21295).



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|---|--|
| <p>conservation and management at central levels of the RGC.</p> <ul style="list-style-type: none"> <li>• The RGC continues to promote, encourage and support fishing communities to participate in fisheries conservation and management.</li> <li>• A collaborative effort to improve sector coordination and management, including conservation, convened by the TWGFi and sub-groups.</li> <li>• The Donor community continues commitments to strengthen institutional capacities of CFis and CBOs for fisheries conservation.</li> </ul>   | <p>jurisdictional overlap of FiA Departments responsible for different conservation categories complicate the application of the EAFM.</p> <ul style="list-style-type: none"> <li>• Limited political will at sub national level to effectively deter IUU and destructive fishing and such environmental crimes as cutting or clearing mangrove and flooded forest for development projects.</li> <li>• Limited readiness at local levels to deter governance related threats to inland and marine fisheries resources and aquatic ecosystems by local patronages and vested interests.</li> <li>• Lack of cooperation among agencies and uncertain and/or overlapping mandates allowing one agency to blame another for enforcement ineffectiveness.</li> <li>• Ineffective education of perpetrators instead of punitive actions and persecution with sufficiently deterrent sanctions.</li> <li>• Weak governance and social organization limit the institutional capacity of communities for partnering local competent authorities in resource and environmental conservation and management.</li> </ul>                      |
| <p><b>Opportunities</b></p>   | <p><b>Threats</b></p>  |
| <ul style="list-style-type: none"> <li>• Cambodia is in the process of conducting a legal review of its Fisheries Law and a new /amended law that can provide improved scope for fisheries conservation and management is being drafted.</li> <li>• The National Fisheries Management Plan postulated by the Fisheries Law provides an important opportunity to develop an overarching policy and planning framework for the sector including for fisheries conservation.</li> <li>• The Fisheries Law postulates a National Fishery Policy Formulation Committee which could foster sector coordination and synergies.</li> <li>• Several sub-decrees and proclamations targeting or enabling specific conservation measures are being developed.</li> <li>• The implementation of the NPOA IUU fishing and the NPCI will provide opportunities to improve fisheries conservation in concert with enforcing compliance of legal and regulatory provision.</li> <li>• Regional efforts (SEAFDEC, MRC) provide improved opportunities for international and transboundary cooperation of conservation and management efforts.</li> </ul> | <ul style="list-style-type: none"> <li>• Overcapacity, over- and IUU fishing are continuing to deplete fisheries resources and destroy habitats largely unabated, due to low enforcement capacities and weak governance.</li> <li>• The annual flooding cycle, a key driver of recruitment, biodiversity and abundance of inland fish stocks is becoming unpredictable due to climate change.</li> <li>• Climate change creates perturbation of marine environments negatively affecting marine stock recruitment, diversity and abundance.</li> <li>• Climate change will increase the occurrence of droughts and, directly related, will increase the risk of wildfires and resulting loss of habitats.</li> <li>• Development of hydropower dams will create barrier effects for migrant fish species and will disrupt flooding patterns, water and nutrient availability and sediment transport.</li> <li>• Irrigation and other intrusions into aquatic ecosystems threaten the connectivity of flood plain and wetlands upon which inland fisheries depend and, thus, stock recruitment, abundance and diversity.</li> </ul> |

|   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• Surveillance technologies such as vessel tracking devices and drones are becoming available at moderate prices.</li> <li>• The emergence of ecotourism provides a convincing rationale for decision makers to support conservation of the aquatic ecosystems the industry relies on.</li> <li>• There are opportunities to improve international dialogue on alternative dam design and planning which could mitigate negative environmental impacts.</li> </ul> | <ul style="list-style-type: none"> <li>• Large scale mono culture agro industries and irrigated production of high yielding rice varieties and other threats such as mining increase emission of pollutants, risking deterioration and ultimately collapse of aquatic ecosystems.</li> <li>• Pollution such as plastic waste and pesticide run-off, and ghost fishing by abandoned nets<sup>26</sup>.</li> <li>• Encroachment into inundated and mangrove forests, wetlands and intertidal areas by land reclamation and development of agriculture and mass tourism, urbanization and in-migration.</li> <li>• The continuing use of destructive gear targeting juveniles and “trash fish” for aquaculture feed will further deplete inland and marine resources.</li> <li>• Population growth and reliance of poor communities on fisheries resources increases fishing pressure concurrent with reductions in resource availability due to the above threats.</li> </ul> |
|---|---|

## 4. Strategic planning framework

### 4.1 Classification of areas under conservation and management

The FiA is mandated with the conservation and management of fisheries and fishery resources of the inland and marine fisheries domains under national jurisdiction. The mandate includes management of areas designated/proclaimed as areas under conservation, divided into (i) areas with conservation status, (ii) critical habitats, and (iii) areas for the protection of endangered species, and protection of critical habitats located in open access areas of the inland and marine fisheries domains not designated as conservation areas.

The sub-categories of areas with conservation status, all of which are no-take zones, are defined as:

- State fisheries conservation areas are inland and marine/coastal no-take areas defined, managed and protected by the RGC;
- Community fisheries conservation areas/fish conservation zones are inland, marine and coastal no-take areas, defined by communities within CFi boundaries that come under community fishery management and protection, with government support.
- Community fish refuges are inland no-take areas proclaimed, protected and managed by communities within rice-fields and dry season refugia areas.
- Protected areas for endangered species are inland and marine no-take areas for endangered species protection.

<sup>26</sup> A survey by FFI found that in the Marine fisheries management areas in the Koh Rong archipelago plastic made up 80 % of the total debris, of which 48 % were regularly dumped into the sea, together with 50 % of used fishing nets.

In addition to areas with conservation status, critical habitats located in open access areas of the inland and marine fisheries domains are protected, not as no-take areas but by enforcing pertinent legal and regulatory provision.

Present estimates of the number/extent of inland and marine areas with conservation status, critical habitats in the inland and marine fisheries domains under open access and areas where endangered species are protected, are shown in the summary tables below<sup>27</sup>.

*Table 2: Estimates of areas with conservation status, critical habitats under open access and protected areas for endangered species by 2019*

|  | Number | Area (ha) | Conservation and management approaches (how, see following chapter)  | Responsibilities, collaborators (who)   |
|--|--------|-----------|--|---|
| <b>Inland and marine fisheries areas with conservation status</b>      |        |           |  |   |
| Great Lake fish sanctuaries  | 8      | 22,500    | Mapping, boundary demarcation<br>Zoning and buffer areas<br>Protection<br>Enhancement<br>Monitoring  | FiA/DFC<br>FiAC<br>Local authorities<br>DPs/NGOs                                  |
| Fisheries conservation areas in the Great Lake (former fishing lots)   | 23     | 93,246    | As above, plus consider prioritizing according to ecological relevance and capacity to protect   | FiA/DFC<br>FiAC<br>Local authorities<br>DPs/NGOs                                  |
| Chaktomuk fisheries conservation area (former fishing lots)            | 27     | 4,257     | As above, plus riverine habitat enhancement  | FiA/DFC<br>FiAC<br>Local authorities<br>DPs/NGOs                                  |
| Mekong Dolphin Protection and Management Zone                          | 1      | 77,630    | Mapping, plus consider establishment of exclusion/ buffer zones, physical barriers for no-take areas, habitat enhancement and research                         | FiA/DFC<br>FiAC<br>Local authorities<br>DPs/NGOs                                  |
| Royal Turtle and Siamese crocodile management area in Sre Ambil System | 1      | 1,470     | Mapping, boundary demarcation<br>Protection/Patrolling<br>Habitat enhancement<br>Public awareness<br>Monitoring and research<br>Improved management mechanisms | FiA/DFC/DFCO<br>FiAC<br>Local authorities<br>Fisheries<br>Communities<br>DPs/NGOs |
| Marine fisheries management areas in Kep and Koh Rong archipelagos     | 2      | 51,842    | Mapping, boundary demarcation<br>Protection/Patrolling<br>Habitat enhancement<br>Public awareness<br>Monitoring and research<br>Improved management mechanisms | FiA/DFC/DFCO<br>FiAC<br>Local authorities<br>Fisheries<br>Communities<br>DPs/NGOs |
| Marine Fisheries Refugia for Mackerel in Koh Kong                      | 1      | 1,283     |  |   |
| Total  | 63     | 252,228   |  |   |
| <b>Community fisheries conservation areas</b>                          |        |           |  |   |
| Inland CFI conservation  | 462    | 4,777     | Mapping<br>Boundary demarcation<br>Protection, including from pollution<br>Zoning  | FiA/DFCO<br>FiAC<br>Local authorities<br>Fisheries                                |

<sup>27</sup> All data provided by FiA/DFC

|  |     |          |  |   |
|--|-----|----------|--|---|
|  |     |          | Enhancement  | Communities<br>DPs/NGOs   |
| Coastal CFi conservation                   | 55  | 5,658    | As above, plus mangrove restoration  | FiA/DFCO<br>FiAC<br>Local authorities<br>Fisheries<br>Communities<br>DPs/NGOs |
| Total                                      | 517 | 12,435   |  |   |
| <b>Community Fish Refuges</b>              |     |          |  |   |
|  | 870 | 15,256   | Boundary demarcation<br>Protection<br>Enhancement  | FiA/DAD<br>FiAC   |
| <b>Critical habitats under open access</b> |     |          |  |   |
| Flooded Forests                            |     | 932,141  | <u>Fisheries conservation and management</u><br>Mapping, demarcation and protection,<br>consider registration as state land<br><u>Fire prevention and management</u><br>Capacity building in planning<br>Surveillance, early detection, rapid response<br>Community involvement, awareness raising | DFA, DFC,<br>CFDD, FiAC and<br>local authorities                              |
| Mangrove Forest                            |     | 58,522   | As above except for fire prevention and<br>management  | DFA, DFC,<br>CFDD, FiAC and<br>local authorities                              |
| Coral Reef                                 |     | 2,800    | Mapping, demarcation and protection  | DFA, DFC,<br>CFDD, FiAC and<br>local authorities                              |
| Sea grass beds                             |     | 30,000   | Mapping, demarcation and protection  | DFA, DFC,<br>CFDD, FiAC and<br>local authorities                              |
| Total                                      |     | 1023.463 |  |   |

Designated State inland and marine fisheries conservation areas<sup>28</sup>, all of which are no-take zones, are under the direct responsibility of the Department of Fisheries Conservation (DFC). They are areas providing for shelter, feeding, breeding and nursing of fish and other aquatic organisms, and safeguarding stock abundance and diversity. They are clearly defined geographically as no-take areas, spatially and/or temporarily. Patrolling of State conservation areas is done by patrol teams from FiA Cantonments, with or without the participation of stakeholders, such as other FiA officers, other sub-national authorities and local police.

Inland conservation areas include fish sanctuaries, critical habitats, such as inundated forests (in particular gallery forest), deep pools and perennial water bodies, as well as areas where endangered species are protected.

For the inland fisheries domain, there are eight fish sanctuaries in the Tonle Sap Great Lake and fisheries conservation areas. The latter are former fishing lots in the Great Lake (23) and the Chaktomuk areas of the Tonle Sap and Mekong rivers (27, see table below). State inland conservation areas are shown in Annex 2.1.1.

<sup>28</sup> Through sub-decree or proclamation of MAFF.

Protected areas for endangered species are the Mekong River Dolphin Protection and Management Zone of the deep pools near Kratie, which is a critical habitat for Irrawady dolphins, and the Mekong Fisheries Biodiversity Management and Conservation Zone.

Marine conservation areas are managed as no-take, buffer or multiple use zones; they include critical coastal and marine habitats such as sea grass beds, coral reefs, mangroves, and intertidal areas and mudflats essential for the functioning of marine and coastal ecosystems. At present, there are two designated marine fisheries management areas (MFMA): the Koh Rong Archipelago MFMA and the Kep Archipelago MFMA. The former is focusing on protection of coral reefs but efforts also target protection of mangroves and sea grass areas in their management area, the latter primarily on the protection of sea grass beds but also include protection and recovery of coral. Both engage in fighting overfishing, IUU fishing and destructive fishing, in particular bottom trawling. Another strategic element of MFMA management is the promotion of eco-tourism to support conservation efforts and to create income and employment in local communities. The marine conservation areas are shown in Annex 2.1.2.

The Kep Archipelago MFMA includes refugia for blue swimming crabs; other refugia have been declared for juvenile grouper in Kampot province and Indo-Pacific Mackerel in Koh Kong Province. Marine fisheries refugia are spatially and geographically defined marine or coastal areas in which specific management measures are applied to sustain important species during critical stages of their life cycle, for their sustainable use. A map showing the location of these refugia is provided in Annex 2.1.5.

Community fishery conservation areas or fish conservation zones are inland, coastal and marine locations within CFi management areas, identified and defined by communities and endorsed by national government, as part of the community fishery mandate provided, legally, under the CFi sub-decree. They are designated as no-take zones and include perennial water bodies and deep pools where fish retreat during the dry season. They are governed by co-management arrangements, with communities collaborating with sub-national authorities and executive arms e.g in patrolling by joined CFi and FIA Cantonment teams, with or without other stakeholders. CFi conservation and management efforts are under the guidance of FiA's Community Fisheries Development Department (CFDD).

The rationale of community fish refuges (CFRs) is to support rice field fisheries which provide catches of some 150,000 tons of fish per year or 30 % of all inland fisheries production and supplement incomes of rice farming households<sup>29</sup>. Fish refuges are both natural and man-made inland perennial water bodies connected to rice paddies where water remains in the dry season and/or man-made/enhanced water bodies e.g. dry season ponds. They are managed as no-take zones, allowing fish and other aquatic animals to retreat and shelter during the dry season, and to re-colonize paddy fields in the rainy season.

Efforts include protection of refuges, both man-made and natural, by surveillance and enforcement of regulations, by maintaining connectivity and by enhancement. The latter include restocking, with

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<sup>29</sup> For the refuges supported by WorldFish in provinces around the Tonle Sap Great Lake significant increases of fish catches of up to 70 % have been recorded. In addition, refuges provide water for household use in the dry season.

focus on locally sourced indigenous species following international guidance<sup>30</sup> and physical improvements as deepening of water bodies to improve their dry season water retention capacity. CFRs are under community management with the assistance of the Department of Aquaculture Development (DAD).

Conservation and protection of designated/proclaimed conservation areas does not include protection of critical habitats located in open access areas of the inland and marine fisheries domains such as flooded forests and mangrove areas, sea grass beds and coral reefs. Critical habitats in areas under open access of the inland and marine domains are not managed as no-take areas but protected by enforcing legal and regulatory provisions i.e. the Law on Fisheries which is presently under revision (see 3.5 above). Surveillance and enforcement is overseen by the Department of Fisheries Affairs (DFA) at central level and implemented by provincial and district competent authorities at sub-national levels, in conjunction with executive arms of the RGC's Ministry of Interior such as police, maritime police, and the Navy.

Part of the mandate of DFA is to foster fire prevention and management by FiACs in the inundated forest and scrub areas during the dry season.

Maps of critical habitats are provided in Annex 2.1.4/6/7.

The specific mandates of the four FiA departments (DFC, DFA, CFDD, and DAD) engaged in fisheries conservation and management are provided in Annex 4.

## **4.2 Strategic approaches to fisheries conservation and management**

In the following section, strategic approaches to fisheries conservation and management are discussed for the three categories of areas with conservation status identified above, and for critical habitats under open access. For each, respective lessons learned are highlighted and conservation and management approaches are proposed, providing an overall long term strategic approach to sector management.

The section also lists quantified targets which the respective FiA Departments intend to achieve and which are reflected the indicators identified in the indicative log frame presented below. These targets are tentative to the extent that they are not precluding the 5-year management plans which every Department is expected to develop under this Strategic Plan. The same as the log frame, they are intended as a strategy framework providing guidance for the 5-year plans and the yearly operational planning which will formulate timelines and budgetary provision for implementation.

### **4.2.1 Strategic approaches**

#### **4.2.1.1 State conservation areas**

Principle approaches used for conservation and management of all conservation and management areas, whether under conservation status or under open access, include demarcation, patrolling and surveillance, to detect and deter over- and destructive fishing and environmental degradation. They are carried out as functions of sovereign state and administered "from above", without or with

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<sup>30</sup> The SPF 2015-2024 postulates that "stock enhancement is 1) in line with wider policy, 2) is ecologically safe, 3) will lead to desired productivity increases, 4) is economically and socially desirable, and 5) enhances the livelihoods of fisheries-dependent communities".

varying degrees of fishers and stakeholder participation. Additional interventions designed to protect and conserve fishes in critical habitats are undertaken in the State Conservation Areas. These actions include flooded forest protection, selective no-take and buffer zoning and placement of physical protective barriers and fish attractant devices that are designed to enhance the conservation effectiveness and value of these critical conservation areas. State Conservation Areas, in particular, are designated to address the need for protecting particular species of conservation importance, such as the Mekong Giant Catfish, and to improve the overall conservation of biodiversity that provides resilience to the fishery and maintains critical ecosystem services.

**Lessons learned** suggest that key factors determining success of state administered conservation are (i) availability of budget and logistics mapping, demarcation, patrolling and surveillance and (ii) acceptability of legal and regulatory provisions and their enforcement on the part of fishers. Budget and logistics are discussed in Chapter 7 below, emphasising that availability allocation of budget and logistics at sub-national levels will be crucial. With continuing low RGC funding, dependence on funding by donors and NGOs will be a fact of life for some time to come. For the logical framework developed for the Strategy in the following, availability of budget and logistics is therefore considered as an assumption, not determined by decision making at conservation and management effort levels at central level.

Acceptance of legal and regulatory provisions and their enforcement depend on their legitimacy of enforcing compliance as perceived by fishers, their communities and organizations.

**Effectiveness** of patrolling hinges not only on coverage and frequency but also on whether or not perpetrators are prosecuted according to law, sanctions that are sufficient to deter not only them but also their peers from breaching legal and regulatory provisions. Lessons learned show that a major constraint to effective deterrence of infringements reluctance of local authorities and lack of political will to supporting enforcement and prosecution of non-compliance.

With uncertainty funding and political will, promising results have been recorded with the passive “obstruction” of the most destructive gear used in the Cambodian EEZ, bottom trawling (and worldwide) by the deployment of so called “fish boxes”<sup>31</sup> i.e. concrete structures which effectively and efficiently obstruct the use of bottom trawls. The effectiveness of the devices is demonstrated, in the Kep Archipelago MFMA, by the fact that, in areas where they are deployed, bottom trawling practically ceased.

“Fish boxes” are also **efficient** because they require a onetime investment only and, where sea bottoms are soft, an occasional reinforcement/topping up. While “fish boxes” are most effective for the protection of sea grass beds, they are also useful for the protection of buffer zones of coral reefs. Their use as “fish aggregating devices” may be considered in fringe areas of MFMA’s if the use of purse seines or other encircling devices can be prevented. Their deployment in other shallow areas as mud flats could be considered if overfishing by bottom trawling is threatening resources like shrimp.

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<sup>31</sup> The term “fish boxes” is somehow ambiguous, because they not only obstruct trawling (sometimes called anti trawling blocks) but also facilitate repopulation, provide shelter and substrate for algae, other benthos and shellfish, they also facilitate fish aggregation.

Efficiency of surveillance, in particular of extended areas as flooded forests wetlands, mangroves and sea grass beds, could be improved by the use of drones. To be effective, enforcement would require a rapid response force fully authorized and equipped to immediately intervene when infringements are detected, as well as enforcement by prosecution and deterrent sanctions, as pointed out above.

**Targets** of State fisheries conservation do not include the extension of present inland fisheries areas under conservation and management, except when cantonments and sub-national authorities request to designate additional conservation areas in their province. Instead, the pledged strategic priority is to improve effectiveness of conservation and management following the lessons learned outlined above. Achievements of this over time areas will depend on the availability of funds and political will, in particular at sub-national levels.

Regarding targets of State conservation in coastal and marine waters, and given their limited extent and their central role for stock abundance and diversity, FiA is considering, to put all remaining sea grass beds and coral reefs under conservation, in the medium and long term. To do this, a phased approach based on good science needs to be employed, allowing building up necessary financial and logistical capacities, creating public awareness, political will and strategic alliances. At present, three new MFMA's are being planned. They will cover approximately 8,000 ha of sea grass beds and 2,000 ha of coral reefs. For the former, possibilities of improving connectivity by restoring sea grass corridors may be explored.

As mentioned above, three fisheries refugias, for blue swimmer crab, Indian Mackerel and juvenile groupers, are or are in the process of being created. There are 13 potential refugias in Cambodian coastal areas and their progressive proclamation would be aligned with existing and any additional MFMA's.

#### 4.2.1.2 Community fisheries conservation areas

As for State conservation areas, mapping, demarcation, patrolling and surveillance, to detect and deter over- and destructive fishing and environmental degradation are principle tools of CFi conservation zones. They are however not administered “from above” but governed by co-management arrangements, e.g with CFi committees collaborating with sub-national authorities in joint CFi and FiAC patrolling teams and executive arms of local Government. Each community fishery area includes at least one area designated as a no-take area that needs to be protected by the community for the conservation benefit of the fish community. These exclusion zones are critical to ensure juveniles have a ‘safe-haven’ to grow to adulthood and should be located in important habitats. The purpose of these areas is to provide refugia and to allow fish population recovery, protection of critically endangered species and maintenance of biodiversity. Various Conservation activities, as detailed below, are critical in these areas and should be supported by sustainable financing mechanisms developed by the community fishery.

**Lessons learned** from CFi and co-management of natural resources in general identify robust management committees as the most important factor for **effectiveness** of CFi management. Transparently elected committees representative of the fishers and community and transparent operational procedures will foster legitimacy and acceptance of regulations and, thereby, inclusive compliance. In contrast, management committees composed of non-transparently elected members



following their interests instead of those of the community they represent. Lack of representativeness and legitimacy jeopardizes and ultimately diminishes inclusiveness and equity of benefit distribution experience.

Experience also shows that if non-compliance with legal and regulatory, whether by free riders or by community members, is not sanctioned by enforcing and prosecuting offender can easily erode motivation to abide with rules, therefore, chances for collective compliance. The present uncertainties of legal competencies of e.g. FiA, CFis and the Ministries of Environment and Interior suggest that clarification and transparency of institutional competencies are an important condition to better enabling CFis enforcing compliance. Effectiveness will be facilitated further by increasing participation of institutional stakeholders in central functions of patrolling and deterring unlawful acts such as encroachment of flooded forests and cutting of mangroves .

Another major factor constraining the effectiveness of co-management is limited funds and logistics of both CFI committees and FiA Cantonments. In order to reduce dependency on external financing chances and potentials for community self-financing are presently being explored (see Chapter 7). Lessons learned show that a major factor for successful and sustainable self-financing will be accountability of the organization which manages the funds.

General social factors favouring or constraining strong organization, as social cohesion and governance have been discussed above, including raising awareness as a key factor for to achieving or improving acceptance for enforcing regulations. Awareness, in communities, the sub-national as well as the national public, of the importance of conservation and management of aquatic fisheries resources for livelihoods, food security and the economy will allow for acceptance of regulations and their enforcement and for a “culture of voluntary and collective compliance” - which is the rationale of co-management - to emerge.

**Targets** set by the CFDD is to have at least one conservation area in every CFI by 2028 and to eliminate 95 % of destructive fishing and habitat encroachment by intensified patrolling and prosecution of offenses. By increasing revenues it is envisaged to reduce CFI dependency on external financing inter alia by promoting eco-tourism facilities e.g. having at least 28 CFis with respective facilities by 2028.

#### 4.2.1.3 Community fish refuges

The rationale of fish refuges is supporting rice field fisheries by facilitating re-colonization of paddy fields in the rainy season, as outlined in 4.1 above. Efforts include protection of refuges, both man-made and natural, by surveillance and enforcement of regulations, by maintaining connectivity and by enhancement. The latter include restocking, with focus on locally sourced indigenous species following international guidance<sup>32</sup> and physical improvements as deepening of water bodies to improve their dry season water retention capacity.

As outlined above for CFR management committees, organizational strength and perceived legitimacy of refuge management committees has been found to be the single most important factor

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<sup>32</sup> The SPF 2015-2024 postulates that “stock enhancement is 1) in line with wider policy, 2) is ecologically safe, 3) will lead to desired productivity increases, 4) is economically and socially desirable, and 5) enhances the livelihoods of fisheries-dependent communities”.

and **lesson learned** for refuge management to function and for communities to take ownership of refuges. To this, sufficient and sustainable finance and collaboration with sub-national authorities need to be added as key factors. For the former, a fully participatory approach involving the community, neighboring communities, sub-national authorities and FiA is essential, including participatory M&E; for the latter, strengthening self-financing capacities need to be increased.

Another lesson learned, in Cambodia and in the region is that restocking of water bodies is not without risk as this can affect ecosystem functioning, cause changes in fish community structure and loss of genetic integrity. In this respect, the use locally sourced indigenous species for stock enhancement is good policy.

**Targets** of the DAD are projecting community fish refuges to reach 1255 refuges by 2028 while efforts to improve the performance of existing refuges e.g. by deepening, improving connectivity and restocking will continue. WorldFish will continue targeting supporting and improving fish refuges giving preference to poor households relying predominantly on rice cultivation for income and food.

#### **4.2.1.4 Protection of critical habitats in inland and marine waters under open access**

Conservation and protection of critical habitats in areas under open access of the inland and marine domains follow the legal and regulatory provisions of the Fisheries Law, as part of the mandate of the DFA. Efforts include management of access e.g. by vessel registration and licencing and combating illegal and destructive fishing e.g. by implementing the NPOA IUU and the NPCI once they are adopted. Surveillance and enforcement are implemented by provincial and district competent authorities at sub-national levels, in conjunction with executive arms of the RGC such as police, maritime police and navy. Critical habitats in areas under open access to be protected include flooded forests, mangroves, corals and sea grass beds.

Part of the mandate of DFA and DFC is to foster fire prevention and management by FiACs in the inundated forest and scrub areas during the dry season, with strategy development expected to benefit from the new EU project “Integrated sustainable landscape management of the Tonle Sap Biosphere Reserve in Cambodia”.

**Lessons learned** show that, as for State conservation above, legal and regulatory provisions are enforcement of regulations functions of sovereign state and administered “from above”. This underlines the importance of building public awareness for the importance of protecting critical habitats, and that **effectiveness** and acceptance of surveillance and enforcement could be improved by stakeholder participation e.g. in patrolling.

As discussed above State conservation, **efficiency** of surveillance of extended areas as flooded forests (including for fire detection) and mangroves and sea grass beds could be improved by the use of drones. Mangroves, for example, have been progressively depleted, by speculation fuelled land grabbing, development of mass tourism, urbanization and other encroachments, but are still covering large parts swathes of fringing coastal areas, making surveillance a major challenge<sup>33</sup>.

Regarding fire prevention and management<sup>34</sup> in the inundated forest and scrub areas, lessons learned from past flooded forest fires, in particular the devastating in the Tonle Sap Biosphere Reserve in the 2016 dry season, showed that FiA cantonments were ill equipped to control fires, lacking equipment and know how. Lessons drawn from this experience emphasize the need of significantly increased logistics and effective surveillance, by drones and manned outlooks, to cover the extent of fire prone areas.

Political will and building public support for fisheries conservation and management needs to avoid the “poverty trap” where depletion of resources and destruction of the environment is rationalized by the poverty of the perpetrators. Lessons learned e.g. from forest clearing show that the rural poor doing the clearing are often paid by “rich and powerful people” who are the ultimate beneficiaries, leaving the poor without or without access to the natural capital their livelihoods depend on.

**Targets** of conservation of critical habitats under open access: Under the assumption of sufficient funds being available and political will supporting, not obstructing enforcement, DFA and DFC have pledged, to eliminate at least 60% of destructive and illegal fishing to arrest at least 80% of environmental deterioration of critical habitats in open access areas by 2028. This will involve mapping and demarcating of critical areas, patrolling and enforcement by prosecution, with all infringements prosecuted by 2028, and awareness campaigns conducted twice yearly in all of the 12 Provinces which make up the fisheries domain.

According to its mandate, DFA and DFC will train FiACs, CFIs and local authority staff in fire prevention and management and develop respective plans appropriate for local issues and challenges. Implementation will need adequate resource capacity to fight fires, in term of logistics as well as know-how, early warning systems e.g. by forecast of extreme weather, identifying areas most prone to fires, and early detection by manned outlook posts<sup>35</sup> and/or aerial surveillance (including, possibly, heat detecting drones) . Given the need to cover extensive areas effort will include the responsible and active involvement communities and community based organizations (in addition to CFIs), in order to “socialize” fire prevention, detection and suppression; additional efforts will target stopping man-made fires e.g. by promoting good governance and public awareness of the central importance of the flooded forest as a common good.

#### 4.2.2 Strategic priorities

There are several lessons learned from the above which suggest strategic priorities that should be considered for the implementation of the Strategic Plan and the conceptualization of the departmental 5-year plans:

**Political will:** Past experience shows that a major determinant for fisheries conservation and management and for improving sector governance in general is political support enforcement, in particular at sub-national level. Reluctance to “enforce by prosecution” has and is frustrating efforts

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<sup>34</sup> Plans would include guidance on how to place fire breaks. Conservation International is collaborating with the University of Adelaide on fire prevention in replanted areas, including the use of fire breaks.

<sup>35</sup> An example for recruiting and employing observers and fire fighters is “Working on Fire”, an initiative of the South African Government which recruits fire fighters from marginalised communities and train them in fire awareness and education, prevention and fire suppression skills. <https://workingonfire.org/>

to stop illegal and destructive fishing, land grabbing, encroachment on critical habitats and other violations of legal provisions. Approaches to address this challenge could include:

- Providing for accountability and transparency. Political will by provincial authorities to enforce legal and regulatory provisions could be strengthened if failure and reluctance to do so is made public, at local, national and international levels through appropriate engagement of the media<sup>36</sup>.
- Consequent enforcement. To achieve a “culture of compliance” will require, in addition to political will, prompt and consequent enforcement of the Law, whether by confiscation, fining and/or arrest. Especially for infringements detected by remote surveillance e.g. by drones is effective only when followed by “rapid response”, by enforcement teams adequately mandated and equipped, and including by “citizen arrest”.
- Delegation to a higher authority. Reluctance of local authorities to enforce the Law may require referring conflicts and violations to central authorities. The recent “Annual Meeting on Achievements of Agriculture, Forestry and Fisheries”, for example, recommended that “PDAFF/FiAC must control and inspect the fishing ground for violations and report to provincial governor for intervention. In case the violation cannot be resolved, PDAFF must report to the Minister for intervention”<sup>37</sup>.
- Make use of SMART. Using the SMART tool (discussed in 8. below) as an integral part of patrolling could provide facts and figures on infringements and facilitate “naming and shaming” of perpetrators and colluding authorities.

Improved participation: Participation and inclusiveness is a key factor for most central functions of fisheries conservation and management, at all levels.

- Institutional strengthening of community organization. As discussed above, strengthening e.g. of CFi committees is a function of participation of community members, providing for legitimacy and representativeness of the committees and a sense of ownership, by the members, of conservation and management of CFi management areas.
- Participatory patrolling. Participation of local authorities in CFi patrolling and participation of community representatives in patrols of local competent authorities and executive arms of RGC is varied at present. Acceptance of patrolling and, subsequently, enforcement could be increased by more inclusiveness i.e. collaborative patrolling by community members and local competent authorities.
- Fire prevention. Participation of communities will be crucial for fire prevention and management. Community participation will improve effectiveness and efficiency of surveillance, detection and rapid response, and will be instrumental for discouraging “man-made fires”. Rapid response could be facilitated if due process for citizen arrests could be established.

Lessons learned with respect to strategic priorities specific to the categories of conservation and management are outline below. They include but are not limited to:

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<sup>36</sup> Oxfam Cambodia has expressed this in an overarching and programmatic sense in its vision of: "Cambodians, especially women and youth, are empowered to hold government and others with power accountable to realize their right to build a resilient society free from poverty and injustice".

<sup>37</sup> Annual Meeting on Achievements of Agriculture, Forestry and Fisheries 2018-2019 and The Way Forward for 2019-2020, 12-14 March 2019.

- Evaluation and prioritization of State designated protected areas to ensure they are located in ecologically significant areas and that they are able to be effectively protect fish and critical habitats and, subsequently, redefine the areas as necessary, ensuring they follow the model of core no-take areas surrounded by buffer zones. In addition, the deployment of boundary demarcation and concrete protection devices is a priority.
- CFi conservation areas must be identified by each CFi according to ecological importance, designated to include buffer zones, demarcated and managed effectively including through site enhancements, with the strategic priority of developing 5-year management plans for each CFi.
- A strategic priority for CFRs is to enhance the ecological conditions of refuges and maintain their protective status by designating buffer zones and creating additional sites for protection, as well as promoting fish-friendly agricultural practices.
- A strategic priority for critical habitats in open access areas is to raise public awareness of the importance of protecting flooded forest and mangroves, and of habitats critical for stock recruitment as coral reefs and sea grass beds. Raising awareness for the need to protect these habitats should be part of environmental education targeting aquatic ecosystems “across the board”, in schools as well as in the media.
- Improve research and development (R&D) efforts. Applied research on subjects and issues of fisheries conservation and management is presently rather compartmentalized, with public sector institutions as the IFReDI, MANFReDI and Royal University of Agriculture operating in parallel with non state actors as NGOs. Aligned R&D could also provide opportunities to improve capacity building, in quantity but above all in quality e.g. by collaborative curriculum and career development.

An overall priority subsequent to approval and adoption of the Strategic Plan is to support all departments in developing 5-year management plans (see 5. below). In addition, support will be required from IFReDI e.g. to prioritize conservation areas, identify key feeding and spawning sites and other critical habitats, and from MANFReDI e.g. to determine the location of refugia.

#### 4.2.3 Strategy actions for fisheries conservation and management

The following table cross tabulates strategy actions for fisheries conservation and management discussed above, for all key habitats identified.

*Table 3: Strategic actions for fisheries conservation and management*

| Conservation and management areas and key habitats |                |           |            |                      |                |            |        |
|--|----------------|-----------|------------|----------------------|----------------|------------|--------|
| Strategic actions                                  | Flooded forest | Mangroves | Deep pools | Dry season sanctuary | Sea grass beds | Coral reef | Refuge |
| Mapping  | X              | X         | X          | X                    | X              | X          | X      |
| Marking  |                |           | X          | X                    | X              | X          | X      |

|                                       |   |   |   |   |   |   |   |
|---------------------------------------|---|---|---|---|---|---|---|
| Monitoring                            | X | X | X | X | X | X | X |
| Surveillance                          | X | X | X | X | X | X | X |
| Zoning (MPAs, buffer, multiple use)   | X | X |   |   | X | X |   |
| Spatial access restrictions           |   |   | X | X | X | X | X |
| Temporal access restrictions          | X |   | X | X |   |   | X |
| Permanent access restrictions         |   | X |   |   | X | X |   |
| Gear restrictions                     | X | X | X | X | X | X | X |
| Combating IUU fishing                 | X | X | X | X | X | X | X |
| Patrolling                            | X | X | X | X | X | X | X |
| Obstruction of destructive gear       |   |   |   |   | X | X | X |
| Enforcement by prosecution            | X | X | X | X | X | X | X |
| Conservation and restoring habitats   | X | X |   |   | X | X | X |
| Protecting and restoring connectivity | X | X | X | X | X | X | X |
| Habitat/stock enhancement             |   |   |   |   |   |   | X |
| Fire prevention and management        | X |   |   |   |   |   |   |
| Collaborative management              | X | X | X | X | X | X | X |
| Adaptive management                   | X | X | X | X | X | X | X |
| Awareness raising                     | X | X | X | X | X | X | X |

### 4.3 Theory of change

Except for man-made fish refuge ponds and rice-field fisheries, fishery conservation areas, sanctuaries, natural dry-season ponds other critical habitats and natural refuges are, ecologically, parts of the same landscape. Conservation interventions and management should be implemented consistently, irrespective of whether they are managed as conservation areas, under co-management

arrangements within multiple use areas or critical habitats not designated as conservation areas. Therefore, for consistency, simplicity and to allow the Strategic Plan to follow an approach that is ecosystem rather than jurisdictionally focused (i.e. addressing conservation of aquatic ecosystems holistically and across political and institutional borders), these categories have been collapsed and are addressed concurrently in the Theory of Change and the log frame presented in the following:

- On the first tier, marine and inland conservation are separated for the two domains, and respective strategic objectives are identified;
- On the second tier, specific objectives are identified for (i) designated fisheries conservation and (ii) for critical habitats not designated as conservation areas; the first specific objective addresses designated State fisheries conservation areas, conservation areas under CFi management and fish refuges; the second specific objective addresses critical habitats not designated as conservation areas, such as flooded forests, mangroves, coral reefs and sea grass beds.

The Theory of Change for fisheries conservation and management is described by a vision and overall objective, supplemented by strategic and specific objectives, as follows:

*Table 4: Theory of Change for fisheries conservation and management*

|  |   |   |  |
|--|---|---|--|
| <b>Vision</b>  |   |   |  |
| Cambodia's fisheries ecosystems are restored where depleted, conserved and protected for livelihoods and food security of present and future generations                                   |   |   |  |
| <b>Overall Objective</b>   |   |   |  |
| All stakeholders collaborate to conserve and manage Cambodia's fisheries in an environmentally non-degrading, technically appropriate, economically viable, and socially acceptable manner |   |   |  |
| <b>Strategic Objective 1</b>   | <b>Indicator (OVI)</b>  | <b>Source of verification</b>               | <b>Risks and assumptions</b>   |
| Inland fisheries ecosystems protected and managed effectively  | By 2028, 17 % of inland fisheries area under protection and conservation  | ASDP/SPF indicator monitoring, DP reporting | Risk: Hydropower and other developments negatively affecting connectivity in Cambodia and the LMB continue undeterred and unmitigated  |
| <u>Specific objective 1.1</u>  | By 2028 80% (222,900ha) of total fisheries conservation area is well managed  | ASDP/PASDP/SPF monitoring, DP reporting     | Risk: Short term economic and political interests continue to frustrate conservation efforts<br>Assumption: Political will including on local level and sufficient financial resources are available |
| <u>Specific Objective 1.2</u>  | By 2028, By 2028, at least 60% of destructive and illegal fishing eliminated and at least 80% of environmental deterioration arrested | ASDP/PASDP/SPF monitoring, DP reporting     | Risk: Short term economic and political interests continue to frustrate conservation efforts<br>Assumption: Sufficient financial resources are available   |

|   |  |   |  |
|---|--|---|--|
| <b>Strategic Objective 2</b><br>Coastal and marine fisheries ecosystems conserved and managed effectively | By 2028, <b>6%</b> of coastal and marine fisheries area under protection and conservation                                      | ASDP/SPF indicator monitoring, DP reporting       | Risk: short term economic and political interests perpetuate destructive fishing and damaging the environment<br>Assumptions: Sufficient financial resources are available |
| <u>Specific objective 2.1</u><br>Fisheries conservation areas protected and managed effectively           | By 2028, <b>95%</b> of mangrove, sea grass beds and coral reefs proclaimed (PRAKAS) and protected                              | ASDP/PASDP/SPF indicator monitoring, DP reporting | Assumption: Political will including on local level and sufficient financial resources are available   |
| <u>Specific Objective 2.2</u><br>Critical habitats under open access protected and managed effectively    | By 2028, at least <b>70%</b> of destructive and illegal fishing eliminated, <b>60%</b> of environmental deterioration arrested | ASDP/PASDP/SPF indicator monitoring, DP reporting | Assumption: Political will including on local level and sufficient financial resources are available   |

#### 4.4 Indicative logical framework

The logical framework is indicative in anticipation of uncertainties and changes which are likely to occur over the 10 year spans of the Strategic Plan. Under each strategic objective, specific objective, outcomes and outputs are tentatively identified, together with objectively verifiable indicators (OVIs)<sup>38</sup>, sources of verification and risks and assumption.

<sup>38</sup> The OVIs are tentative, having been formulated based on discussions with the responsible FiA departments. They have been discussed and finalized at validation workshop.



Table 5: Logical Framework

| <b>Strategic Objective 1</b><br>Inland fisheries ecosystems protected and managed effectively   | <b>Baseline by 2018</b> | <b>Indicator (OVI)</b><br>By 2028, 17 % of inland fisheries area under conservation                | <b>Source of verification</b><br>ASDP/SPF indicator monitoring, DP reporting | <b>Estimated budget (USD)</b> | <b>Risks and Assumptions</b><br>Risk: Hydropower and other developments negatively affecting connectivity in Cambodia and the LMB continue undeterred and unmitigated                                |
|---|-------------------------|--|--|-------------------------------|--|
| <u>Specific objective 1.1</u><br>Fisheries conservation areas protected and managed effectively |                         | By 2028 80% (222,900ha) of total fisheries conservation area is well managed                       | FiA/SPF/ASDP/PASD/monitoring, DP reporting                                   |                               | Risk: short term economic and political interests continue to frustrate conservation efforts<br>Assumption: Political will including on local level and sufficient financial resources are available |
| <u>Outcome 1.1.1</u><br>State fisheries conservation areas protected and managed effectively    |                         | By 2028, 85 % destructive fishing eliminated and 100 % encroachment of conservation areas deterred | FiA/SPF ASDP/PASDP monitoring, DP reporting                                  |                               | Assumption: Political will including on local level and sufficient financial resources are available   |
| Output 1.1.1.1<br>Conservation areas mapped and demarcated                                      |                         | By 2021, maps for all conservation areas available, 910 pole equivalent deployed                   | FiA/DFC monitoring, DP reporting   |                               | Assumption: Sufficient financial resources are available   |
| Output 1.1.1.2<br>Conservation areas patrolled  |                         | 15 patrols days/month in all conservation areas  | FiA/DFC monitoring, DP reporting   |                               | Assumption: Sufficient financial resources are available   |
| Output 1.1.1.3<br>Compliance enforced by prosecution  |                         | By 2028, all infringements prosecuted  | FiA/DFC monitoring, DP reporting   |                               | Assumption: Political will including on local level available  |
| Output 1.1.1.4<br>Surveillance of conservation areas improved including by                      |                         | By 2020, field trials of drone use completed, drones deployed where feasible                       | FiA/DFC monitoring, DP reporting   |                               | Assumption: Use of drones for surveillance cost effective  |

|   |  |   |   |  |  |
|---|--|---|---|--|--|
| drone deployment and other means  |  |   |   |  |  |
| Output 1.1.1.5<br>Collaboration with executive forces on sub-national level strengthened                  |  | By 2028, collaboration results in 80 % infringements detected   | FiAC records  |  | Assumption: Political will including on local level and sufficient financial resources are available |
| Outcome 1.1.1.6<br>Degraded conservation areas rehabilitated and restored                                 |  | By 2028, 3,500 ha of flooded forest replanted and <b>at least 2,000ha of the fisheries conservation (shallow areas) rehabilitated</b> | FiA/DFC monitoring, DP reporting                        |  | Assumption: Political will including on local level and sufficient financial resources are available |
| Output 1.1.1.7<br>Endangered aquatic species in conservation areas protected                              |  | By 2028, Populations of key endangered species increase by <b>15-20 %</b>   | FiA/DFC monitoring, DP reporting                        |  | Assumption: Political will including on local level and sufficient financial resources are available |
| Output 1.1.1.8<br>Public awareness of importance of inland conservation strengthened                      |  | <b>20</b> awareness campaigns/year/province   | FiA/DFC, FiAC, DP reporting                             |  | Assumption: Sufficient financial resources are available   |
| <u>Outcome 1.1.2</u><br>CFi conservation areas protected and managed effectively (includes coastal areas) |  | By 2028, <b>85%</b> of destructive and illegal fishing eliminated and environmental deterioration arrested                            | ASDP/PASDP/SPF monitoring, DP reporting                 |  | Assumption: Political will including on local level and sufficient financial resources are available |
| Output 1.1.2.1<br>CFi committee's capacity to manage conservation areas strengthened                      |  | By 2028, at least <b>80%</b> of CFis under "strong" management  | FiA/FiAC monitoring, DP reporting, baseline assessments |  | Assumption: Sufficient financial resources are available   |
| Output 1.1.2.2<br>CFi committee's self-financing capacity improved  |  | By 2028, dependency of CFi's on external funding reduced by <b>30%</b>  | FiA/FiAC monitoring, DP reporting, baseline assessments |  | Assumption: Sufficient financial resources are available   |
| Output 1.1.2.3  |  | At least 1 of awareness   | PASDP/SPF, DP   |  | Assumption:  |

|  |  |  |   |  |  |
|--|--|--|---|--|--|
| Awareness of importance of conservation increased  |  | campaigns/year/province conducted  | reporting                                     |  | Sufficient financial resources are available   |
| Output 1.1.2.4<br>Conservation areas patrolled in collaboration with executive forces                  |  | At least 2 of collaborative patrols/ 4 CFi patrols per conservation area/ <b>month</b>                                       | ASDP/PASDP/SPF monitoring, DP reporting       |  | Assumption: Political will including on local level and sufficient financial resources are available   |
| Output 1.1.2.5<br>Compliance enforced by prosecution   |  | By 2023, all infringements prosecuted according to law   | ASDP/PASDP/SPF, DP reporting                  |  | Assumption: Political will including on local level supports prosecution   |
| <u>Outcome 1.1.3</u><br>Community fish refuges <b>established</b> and managed effectively              |  | <b>By 2028, 1255 refuges officially recognized effectively managed</b>   | ASDP/PASDP/FiA/FiA C monitoring, DP reporting |  | Assumption: Sufficient financial resources are available   |
| Output 1.1.3.1<br>Refuge committee capacity to manage refuges strengthened                             |  | By 2028, 70% of refuge committees capacity strengthened to manage refuges effectively  | FiA/FiAC monitoring, DP reporting             |  | Assumption: Sufficient financial resources are available   |
| Output 1.1.3.2<br>Refuges protected from destructive fishing   |  | By 2023, destructive fishing eliminated sustainably in 800 refuges   | FiA/FiAC monitoring, DP reporting             |  | Assumption: Sufficient financial resources are available   |
| Output 1.1.3.3<br>Refuge connectivity protected/restored   |  | By <b>2023</b> , abundance of stocks in refuges increased by <b>50%</b>  | FiA/FiAC monitoring, DP reporting             |  | Assumption: Sufficient financial resources are available   |
| Output 1.1.3.4<br>Community awareness of importance of refuges strengthened                            |  | Initial awareness campaigns carried out in all communities with refuges  | FiA/FiAC, DP reporting                        |  | Assumption: Sufficient financial resources are available   |
| <u>Specific Objective 1.2</u><br>Critical habitats under open access protected and managed effectively |  | By 2028, at least 60% of destructive and illegal fishing eliminated and at least 80% of environmental deterioration arrested | ASDP/PASDP/SPF monitoring, DP reporting       |  | Risk: short term economic and political interests continue to frustrate conservation efforts<br>Assumption: Political will including on local level and sufficient financial resources are available |

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| <u>Outcome 1.2.1</u><br>All critical habitats identified, mapped and demarcated  |  | By 2020, maps for all habitats available<br>By 2028, 1294 pole equivalent deployed  | ASDP/PASDP/FiA/FiA C indicator monitoring, DP reporting                          |  | Assumption: Sufficient financial resources are available   |
| <u>Outcome 1.2.2</u><br>Critical habitats patrolled  |  | 10 patrol days/ month each in 8 provinces over 6 months/year  | ASDP/PASDP/FiA/FiA C indicator monitoring, DP reporting                          |  | Assumption: Sufficient financial resources are available   |
| <u>Outcome 1.2.3</u><br>Compliance enforced by prosecution according to law  |  | By 2028, all infringements prosecuted   | PASDP/FiA/FiAC monitoring, DP reporting  |  | Assumption: Political will allows prosecution  |
| <u>Outcome 1.2.4</u><br>Resilience against climate/drought induced forest fires build  |  | By 2023, 20 FiAC/CFi/other local staff/province (8) trained, fire management plans in 8 provinces (incl. No. of fire breaks) in place | PASDP/ FiA/FiAC indicator monitoring, DP reporting                               |  | Assumption: Sufficient financial resources are available   |
| <u>Outcome 1.2.5</u><br>Public awareness of importance of critical habitats strengthened   |  | 2 awareness campaigns/year/province (conducted in 8 provinces)  | PASDP/ FiA/FiAC monitoring   |  | Assumption: Sufficient financial resources are available   |
| <b>Strategic Objective 2</b><br>Coastal and marine fisheries ecosystems conserved and managed effectively                                      |  | <b>Indicator (OVI)</b><br>By 2028, <b>6%</b> of coastal and marine fisheries area under conservation                                  | <b>Source of verification</b><br>FiA/SPF/ASDP indicator monitoring, DP reporting |  | <b>Risks and assumptions</b><br>Risk: short term economic and political interests perpetuate destructive fishing and damaging the environment<br>Assumptions: Sufficient financial resources are available |
| <u>Specific objective 2.1</u><br>Mangroves, sea grass beds and coral reefs in the EEZ proclaimed as conservation areas and managed effectively |  | By 2028, <b>95%</b> of mangrove, sea grass beds and coral reefs proclaimed (PRAKAS)   | FiA/DFC, FiAC monitoring, DP reporting   |  | Assumption: Political will including on local level and sufficient financial resources are available   |

|   |  |   |   |  |  |
|---|--|---|---|--|--|
| <u>Outcome 2.1.1</u><br>Phased fisheries conservation area plan elaborated and implemented              |  | By 2020, plan adopted,<br>By 2022, 3 new MFMA established, plan implemented by 2028 | FiA/DFC, FiAC, DP reporting                               |  | Assumption: Sufficient financial resources are available   |
| Output 2.1.1.1<br>Conservation areas mapped and zoned   |  | By 2020, maps including zoning available,   | FiA/DFC/FiAC monitoring, DP reporting                     |  | Assumption: Sufficient financial resources are available   |
| Output 2.1.1.2<br>Conservation areas demarcated   |  | By 2028, 632 pole equivalent deployed   | FiA/DFC/FiAC monitoring, DP reporting                     |  | Assumption: Sufficient financial resources are available   |
| <u>Outcome 2.1.2</u><br>Conservation areas protected and managed  |  | By 2028, 80 % of illegal and destructive fishing in conservation areas eliminated   | FiA/SPF/FiAC/ASDP indicator monitoring, DP reporting      |  | Assumption: Political will including on local level and sufficient financial resources are available |
| Output 2.1.2.1<br>Conservation areas patrolled  |  | By 2028, 10 fisheries patrol days/month/conservation area                           | FiA/DFC/SPF/ASDP/PASDP indicator monitoring, DP reporting |  | Assumption: Sufficient financial resources are available   |
| Output 2.1.2.2<br>Enforcement strengthened in collaboration with executive forces on sub-national level |  | By 2028, all patrols are conducted in collaboration with executive forces           | PDAFF/FiAC records  |  | Assumption: Political will including on local level and sufficient financial resources are available |
| Output 2.1.2.3<br>Compliance enforced by prosecution  |  | By 2028, all infringements prosecuted   | FiAC records, DP reporting                                |  | Assumption: Political will including on local level and sufficient financial resources are available |
| Output 2.1.2.4<br>Conservation areas protected by obstruction of destructive fishing                    |  | 200 fish boxes/year deployed  | FiA/DFC/FiAC monitoring, DP reporting                     |  | Assumption: Political will including on local level and sufficient financial resources are available |
| Output 2.1.1.5<br>Surveillance of conservation areas  |  | By 2020, field trials of drone use completed, results available                     | FiA/DFC/FiAC monitoring, DP reporting                     |  | Assumption: Use of drones for surveillance cost effective  |

|  |  |   |   |  |   |
|--|--|---|---|--|---|
| improved by drone deployment and other means   |  | By 2028, drone used where feasible  |   |  |   |
| <u>Outcome 2.1.3</u><br>Degraded conservation areas and habitat connectivity restored                  |  | By 2028, 50 ha/year of mangrove restored, 200 fish boxes deployed for restoration of sea grass beds and coral reefs | FiA/DFC/FiAC monitoring, DP reporting                   |  | Assumption:<br>Political will including on local level and sufficient financial resources are available |
| <u>Outcome 2.1.4</u><br>Endangered species in conservation areas protected and managed                 |  | By 2028, population of endangered aquatic species within conservation areas increased by 20%                        | FiA/DFC/SPF/ ASDP indicator monitoring, DP reporting    |  | Assumption:<br>Political will including on local level and sufficient financial resources are available |
| <u>Outcome 2.1.5</u><br>Key economic species/biodiversity protected by fishery refugias                |  | By 2028, 10 more refugias proclaimed and protected  | FiA/FiAC indicator monitoring, DP reporting             |  | Assumption:<br>Political will including on local level and sufficient financial resources are available |
| <u>Outcome 2.1.6</u><br>Public awareness of importance of marine conservation strengthened             |  | 10 awareness campaigns/year/province  | FiA/DFC, FiAC, DP reporting                             |  | Assumption: Sufficient financial resources are available  |
| <u>Specific Objective 2.2</u><br>Critical habitats under open access protected and managed effectively |  | By 2028, at least 70% of destructive and illegal fishing eliminated, 60% of environmental deterioration arrested    | ASDP/PASDP/SPF indicator monitoring, DP reporting       |  | Assumption: Political will including on local level and sufficient financial resources are available    |
| <u>Outcome 2.2.1</u><br>Critical habitats in open access areas protected                               |  | By 2028, at least 80% habitat destruction and overexploitation deterred   | SPF/FiA/PASDP monitoring, DP reporting                  |  | Assumption:<br>Political will including on local level and sufficient financial resources are available |
| Output 2.2.1.1 Mangrove forests protected  |  | By 2023, 95% mangroves mapped and protected (patrolling)  | ASDP/PASDP/FiA/FiA C indicator monitoring, DP reporting |  | Assumption:<br>Political will including on local level and sufficient                                   |

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|--|--|--|---|--|---|
|  |  |  |   |  | financial resources are available   |
| Output 2.2.1.2<br>Sea grass beds and corridors in open access areas protected                                    |  | By 2023, 95% of sea grass beds and corridors mapped and protected (patrolling, fish boxes) | PASDP/FiA/FiAC monitoring, DP reporting |  | Assumption:<br>Political will including on local level and sufficient financial resources are available |
| Output 2.2.1.3<br>Coral reefs in open access areas protected   |  | By 2023, all coral reefs mapped and protected (patrolling)                                 | PASDP/FiA/FiAC monitoring, DP reporting |  | Assumption:<br>Political will including on local level and sufficient financial resources are available |
| <u>Outcome 2.2.2</u><br>Critical habitats in open access areas patrolled   |  | 10 patrol days/ month over 12 months/year conducted in 4 provinces                         | PASDP/FiA/FiAC monitoring, DP reporting |  | Assumption:<br>Sufficient financial resources are available   |
| <u>Outcome 2.2.3</u><br>Compliance enforced by prosecution   |  | By 2023, all infringements prosecuted  | PASDP/FiA/FiAC monitoring, DP reporting |  | Assumption:<br>Political will allows prosecution  |
| <u>Outcome 2.2.4</u><br>Public awareness of importance of mangroves, coral reefs and sea grass beds strengthened |  | 2 awareness campaigns/year each conducted in 4 provinces                                   | PASDP/ FiA/FiAC monitoring              |  | Assumption:<br>Sufficient financial resources are available   |

## 5. Implementation approach

Implementation of the Strategic Plan is mandated collectively to the government departments, community fisheries, civil society organisations, other stake holders in fisheries resource exploitation, and the fishing communities at large. Implementation is overseen and guided by the FiA and will be a collaborative effort of the DFC and FiA's Departments of Fisheries Affairs (DFA), Department of Community Fisheries Development (DFCD) and Department of Aquaculture Development, and supported by the Inland Fisheries Research and Development Institute (IFReDI) and the Marine Fisheries Research and Development Institute.

Bearing in mind the capacity context, implementation of the strategy will need to rely on technical support and is dependent on sufficient investment. All stakeholders including DPs and civil society should align their actions with the Strategic Plan and support the institutional capacity of those mandated to implement the strategy (i.e. government and community) in accordance with their specific roles. Progress should be tracked towards the above strategic objectives of the Strategic Plan, addressing one or more of the indicators of the Plan's log frame. Implementation is proposed to take place in two phases:

- A first phase from 2019 to 2023 for which 5-year Management Plans for Fisheries Conservation and Management are expected to be formulated by DFC, DFA, CFDD and DAD; and
- A second phase to be implemented from 2024 to 2028, aligned with the RS, the NSDP and the ASDP developed for this period.

The 5-year Management Plans will align with the vision and overall objective of the Strategic Plan, review the outcomes formulated for each conservation area in the log frame, add activities and define timelines and itemized budgets. Overall guidance for the formulation of the first 5-year Plans can be derived from the eight strategic objectives proposed for the draft 5-year Management Plan of the DFC and agreed upon by other departments, through a consultative process. They are:

- Protected areas are designed and spatially distributed consistent with ecological requirements for effective conservation and management of fishery resources and in line with the values of the freshwater and marine ecosystems;
- Protected areas are supported by the designation and clear demarcation of multi-use zoning supported by activities that result in the restoration and rehabilitation of key fisheries habitats, improvements to the environment and enhancement of fish stocks.
- Legislation enables protection conservation and management of fisheries, co-management and effective enforcement of legal and regulatory provisions, and managers and users are capacitated to apply legislation for the purpose of fisheries conservation and management,
- Sustainable financing mechanisms are in place and both sub-national authorities and CFIs have sufficient financial resources enabling them to fulfil their mandates to sustainably conserve and manage fisheries resources.



- An improved understanding of fish species ecological needs is being used to design protection policies and restoration and enhancement of fish stocks and their habitats.
- Cooperation at national, regional, and international levels support fisheries resource conservation and management, including effective coordination of FiA, sub-national authorities and CFis;

The second phase will be preceded by an *ex post* evaluation of the first phase and an *ex ante* evaluation of /proposal for the second phase which will provide the basis for the adjustment and reformulation of fisheries conservation and management for the second phase, taking into consideration successes, failures and learning experience from the first phase.

Evaluations will be facilitated by reporting against the indicators listed in the log frame. For both evaluations the OECD /DAC approach for evaluating development assistance is recommended, following the criteria of relevance, effectiveness, efficiency, impact and sustainability, supplemented by the EC criteria of value added and visibility.

## 6. Institutional arrangements

Implementation of the Strategic Plan will require interagency cooperation, specifically but not limited to MAFF/FiA, as the responsible line agency, the Ministry of Environment, responsible for flooded forest and mangrove protection, and the Ministry of Interior, responsible for enforcing legal and regulatory provisions governing the sector. To enforce provisions in support of fisheries conservation and management, the executive arms of the Ministry of Interior need to collaborate with sub-national authorities. Collaboration is particularly essential for deterring and eliminating illegal and destructive fishing, by implementing the NPOA IUU and the NPCI, and following the Fisheries Management Plan foreseen in the Fisheries Law. In addition to RGC agencies, the institutional landscape includes DPs, NGOs and other CBOs as the CFis, and other non-state actors that will be involved in implementing the Strategic Plan.

Prevailing uncertainties from jurisdictional “grey areas” of the existing institutional arrangement constrain effective conservation and management, in particular “enforcement by prosecution” as postulated by the NPCI and reiterated by the Strategic Plan. Coordinated and cooperative enforcement could be improved, not only by clearly structured and transparent interagency cooperation of RGC mandated agencies but also concerning the involvement of DPs, NGOs and other non-state actors e.g. by requiring them to align their activities, such as patrolling, with the Strategic Plan and seeking approval from MAFF/FiA prior to engaging in such activities, and by reporting to MAFF/FiA on progress. Providing straightforward and transparent guidance to communities and civil society on assisting in enforcement e.g. on due process of citizen arrests would also improve effectiveness and efficiency of enforcement efforts overall.

A working example of an existing institutional arrangement is the management structure of the Koh Rong MFMA<sup>39</sup> established at the provincial level. At province level, a Provincial

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<sup>39</sup> Management Plan for the Koh Rong Archipelago Marine Fisheries Management Area 2016-2020, Ministry of Agriculture, Forestry and Fisheries, 2016

Management Committee (PMC) made up of representatives of National and Provincial government coordinates all efforts concerning conservation and management of the marine and coastal ecosystem of the MFMA. At local level, representatives of National and Provincial government and NGO representatives, CFi members and private sector stakeholders form a multi-sectorial Technical Working Group for the MFMA (TWG-MFMA). The role of the TWG-MFMA is to protect and conserve marine fisheries resources and habitats in line with the designated zones of the MFMA, design and implement the MFMA management plan, and raise local awareness, particularly with fishers, of the need for conservation and management. The management plan also includes initiatives to support communities economically through non-extractive activities, to alleviate pressure on fisheries resources.

As an example, the institutional arrangement of the MFMA management is shown in the following diagram.

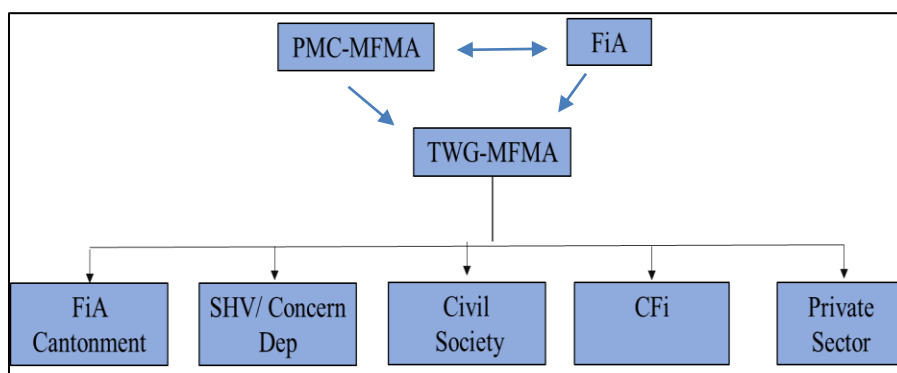


Figure 1: Schematic diagram of the groups involved in the MFMA management plan process

## 7. Financing approach, resources for implementation

Regarding financial resource allocation for fisheries conservation and management, the SPF for Fisheries: 2015– 2024 states that:

- “The Royal Government will continue to provide direct funding to the Fisheries programme as defined by the ASDP,
- In the short to medium term Cambodia will depend on funding arising from development partners,
- The budget for the implementation of SPF will be developed by FiA in association with MAFF and development partners. and
- Overall budget management and control will be held by the FiA”.

Data on the budget which are being generated in the course of revising the ASDP 2019-2023 are shown in the following table:

Table 6: Projected FiA and DP expenditure 2019 -2023

| Description / Year                           | 2019       | 2020       | 2021       | 2022       | 2023       |
|--|------------|------------|------------|------------|------------|
| Government FiA current budget expenditure    | 13,044     | 14,348     | 15,783     | 17,361     | 19,097     |
| Government FiA investment budget expenditure | 1,650      | 1,815      | 1,997      | 2,196      | 2,416      |
| Donor funds                                  | 102,588    | 131,079    | 132,206    | 114,405    | 93,234     |
| Total likely expenditure (Riel millions)     | 117,281    | 147,242    | 149,985    | 133,962    | 114,747    |
| Total likely expenditure (in \$)             | 29,320,291 | 36,810,513 | 37,496,254 | 33,490,442 | 28,686,648 |
| DP as % of total                             | 87%        | 89%        | 88%        | 85%        | 81%        |

The preview of expenditures shows a continuing reliance on development partner financing, with revenue generation at central level showing some but not sufficient increases. This may jeopardize effective implementation of the departmental 5-year management plans, e.g. limiting financing or allocation of funds for CFi management from commune council investment plans. Opportunities to increase public revenues could come from enforcing an improved fiscal regime by taxing commercial operators along the value chain and large scale fishing and aquaculture. The SPF projects, in this respect that (i) growth in revenues generated by the sector will “support the Royal Government’s overall economic ability to provide funding”, adding that (ii) communities progressively take over conservation and management functions within the CFi management areas ... to reduce the cost burden on government, commensurate with the extent to which costs are proportional to the benefits which different groups receive from the fishery”.

The sustainable generation of revenue by CFIs to self-finance community based fisheries conservation and management remains a challenge, however. Lessons learned from over more than a decade of development assistance projects following an “alternative livelihood” approach had limited and often unsustainable impacts. A major reason was that many of the intended beneficiaries are “last resort fishers” with limited or no access to assets beyond fisheries and forest resources e.g. to agricultural land. Thus, generation of financing for CFi management must focus on potential from within the fishery without, however, increasing resource pressure further.

For example, allowing CFIs to have exclusive access to some restricted fishing grounds could provide sustainable financing. This would need FiA/DFC/CFDD to help develop area specific zoning and access regulations in the CFi management plans e.g. avoiding blocking of key migration routes. In addition, allowing CFIs to manage access to the fishing area and charging to outsiders for fishing access, as proposed in the CFi Sub Decree would generate supplementary revenues. In addition, efforts should be made to foster access of CFIs to Commune Investment Plans to provide funds for improved conservation and management of CFi management areas.

Revenue generation from fishing could be supplemented by additional activities associated with the fishery. Recent experiences show potentials for eco-tourism<sup>40</sup>, post-harvest value adding activities, environmentally friendly aquaculture and saving groups/community funds to generate revenue. To develop these and other potentials to significant, inclusive and sustainable levels, continuous and collaborative efforts be necessary, to overcome constraints and build capacities at all but above all on community and household levels.

<sup>40</sup> The MFMA in the the Koh Rong Archipelago is using fees collected from divers for conservation and management.

Increasing community self-financing by is essential for long term sustainability of CFi management and for them to fulfil their mandate of fisheries resource conservation and sustainable fisheries management.

## 8. Monitoring and evaluation

According to the SPF, the primary role of its M&E system is to measure the achievement and non-achievements of indicators established under the ASDP of the Ministry of Agriculture, Forestry and Fisheries. M&E will operate at three levels: “(i) the fisheries sector programme level as indicators of the four sector development pillars; (ii) the sub-programme level, measured by the outcome indicators for each sub-programme as defined by the ASDP, and the activity level, measuring the delivery of outputs by each sub-programme”. The SPF further postulates that “Monitoring will be done on an annual and quarterly basis and supported by periodic site visits. Resource trends will be monitored over the longer period of several years. Evaluation of impact will be done annually. Reporting by sub-programmes will be done on a quarterly and annual basis in line with MAFF’s M&E procedures”.

Accordingly, monitoring of 5-years departmental management plans is proposed quarterly and annually. Results will be synthesised in yearly summary departmental M&E reports, and used to adjust outcomes, outputs and activities of their operational planning.

Yearly M&E of departmental plans will support and feed into the mid-term (after 5 years) and final evaluation of the 10-year Strategic Plan. Both yearly departmental reporting and mid-term and final evaluation of the 10-year Strategic Plan may be augmented by special reporting to cover changes of externalities and adjust risks and assumptions accordingly. This, in turn, will support the development of a Fisheries Information Management System that will facilitate accessibility of information for management and policy development. The system will also be used to track management and legislation effectiveness and identify targets for policy or management intervention or change.

M&E of the 10-year Strategic Plan for Fisheries Conservation and Management is expected to contribute to SPF and ASDP M&E. It will follow the OVI defined for the log frame; for monitoring progress towards the BDC and SDG related indicators proposed for the Strategic Objectives of the log frame is to establish respective baselines for the “per cent of area” targeted to come under conservation and management will be a first challenge<sup>41</sup>.

The OVI of the Strategic Plan will provide the framework for the indicators which will be formulated for each of the 5-years departmental management plans. All indicators will strive to be specific, measurable, achievable, relevant and time-bound. In order to ensure that they effectively track progress towards each strategic objective of the 10-year Strategic Plan and the 5-year plans M&E will focus on (i) relevance of implemented of actions or interventions, for

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<sup>41</sup> For inland fisheries this would imply the approximation of both the dry and wet season extent of total water “area”, for marine fisheries it would relate to the part of the EEZ that is under national jurisdiction, and the mangrove forest areas straddling the inland and marine fisheries domains

example demarcation, patrolling and enforcement, or habitat restoration and (ii) the effectiveness and efficiencies of the actions or contribution and (iii) impact and sustainability of implementing of the Strategic Plan and the departmental plans. With respect to the latter, impacts of surveillance, enforcement and prosecution on abundance of fish stocks, maintenance of biodiversity, recovery of endangered and other conservation important species, and retention or enhancement of stocks will be recorded.

In particular regarding surveillance and enforcement the application of the “Spatial Monitoring and Reporting Tool” (SMART) tool is foreseen. The SMART tool is a management tool developed by a collaboration of conservation practitioners<sup>42</sup>. It was developed for measuring, evaluating and improving the effectiveness of wildlife law enforcement patrols and site-based conservation activities. Data is collected through GPS track logs and recorded way points at incidents by rangers or community wardens, this information is then fed into the SMART software and used to produce maps and a report. These reports are then fed back to local enforcement agencies, rangers, community patrols teams and conservation managers in order to adapt management accordingly and allow for strategic planning. The SMART cycle is shown in the diagram below.



*Figure 2: The SMART cycle*

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<sup>42</sup> Quoted from Management Plan for the Koh Rong Archipelago Marine Fisheries Management Area (KRA) op. cit. SMART has been fully operational in the KRA since October 2015. Data is collected by the three community fisheries in the area, information is then provided to a focal point at the cantonment level and used to create monthly and quarterly reports. These reports are fed to the National FiA as well as back to the patrol teams. As capacity of the field teams increases and more resources are available to support patrolling costs, this tool will enable a more targeted and effective patrolling effort in the site.

## Annex 1: Facts and figures

### 1.1 Cambodia's marine and coastal areas (Baran)

#### Needs to include inland/update

No. Coastal Provinces 2

No. Coastal Municipalities 2

No. Coastal Districts: 16

No of Coastal Villages 93

Area of Coastal Provinces 17,791 km<sup>2</sup>

Area of Coastal Districts 15,748 km<sup>2</sup>

Area of Claimed EEZ 42,000 km<sup>2</sup>

Population of Coastal Provinces (1998) 836,973

Population of Coastal Districts (1998) 515,253

National Per Capita GDP (1998) R 654,000

Area of land Mines in Coastal Provinces 5,120 ha

Marine Fisheries Production (1998) 31,843 tons

Aquaculture Production (1998) 1,600 tons

Products Exports (1998) 15,082 tons

Length of Coastline 435 km

Area of Mangroves (1997) 63,039 ha

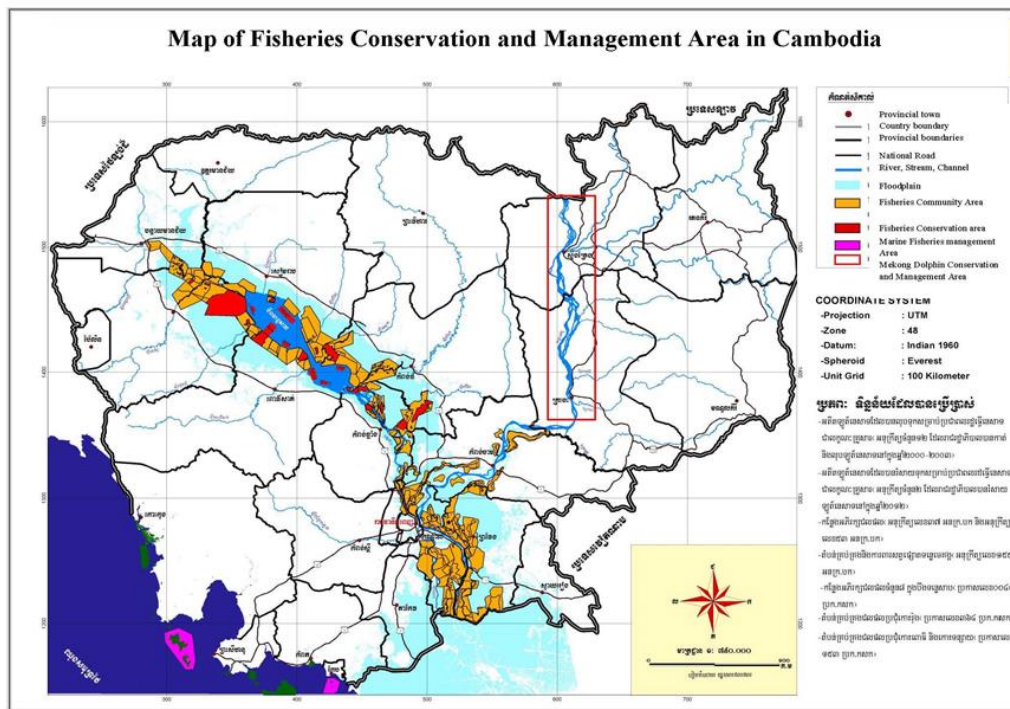
Area of Priority Coastal Wetlands (1997) 54,500 ha

Number of Coastal, Marine Protected Areas 6

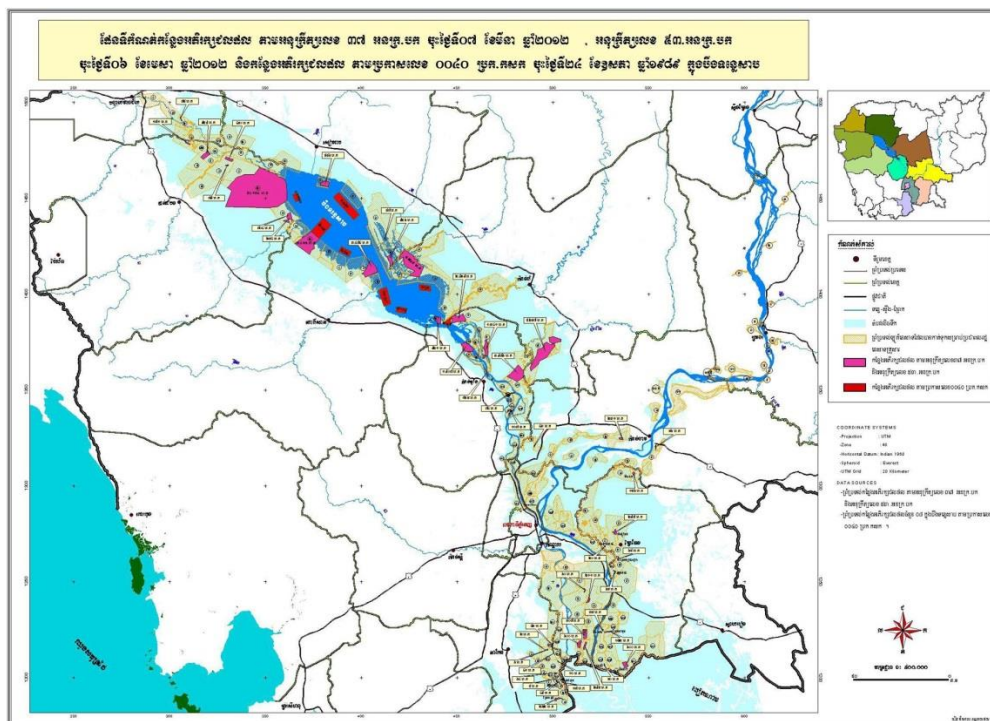
Area of Coastal, Marine Protected Areas 388,700 ha

## Annex 2. Maps of fisheries conservation areas and critical habitats

### 2.1 Conservation and management areas

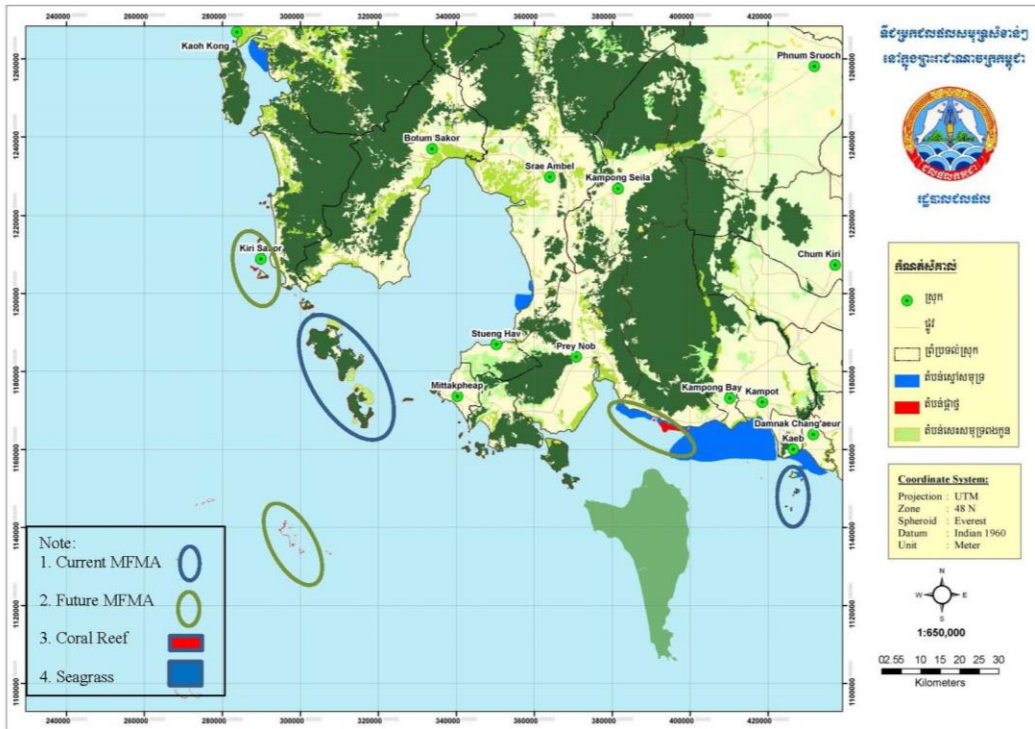


#### 2.1.1 Inland conservation areas

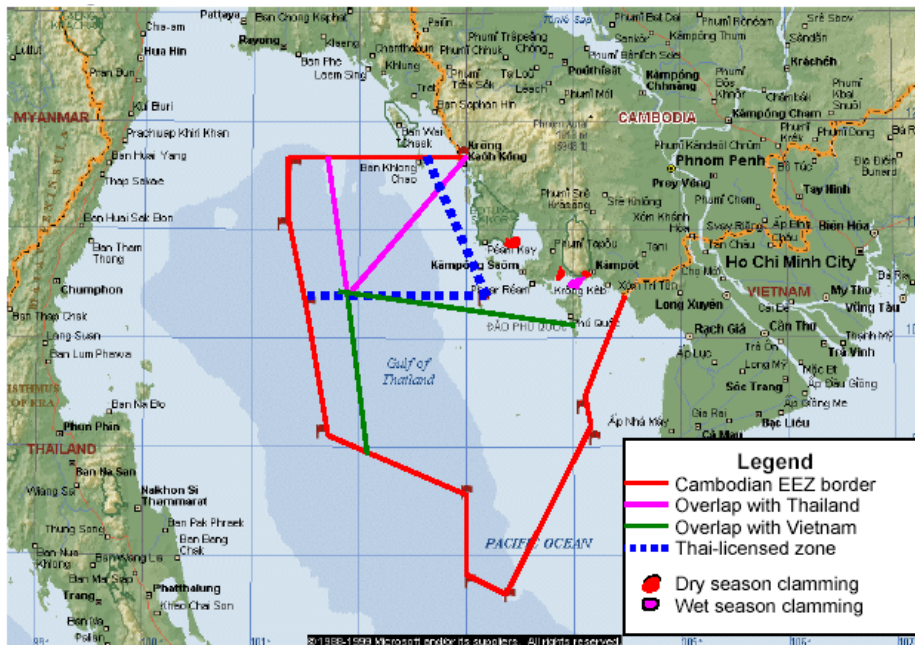


## 2.1.2 Current and planned marine conservation areas

Current and future MFMA in Cambodia

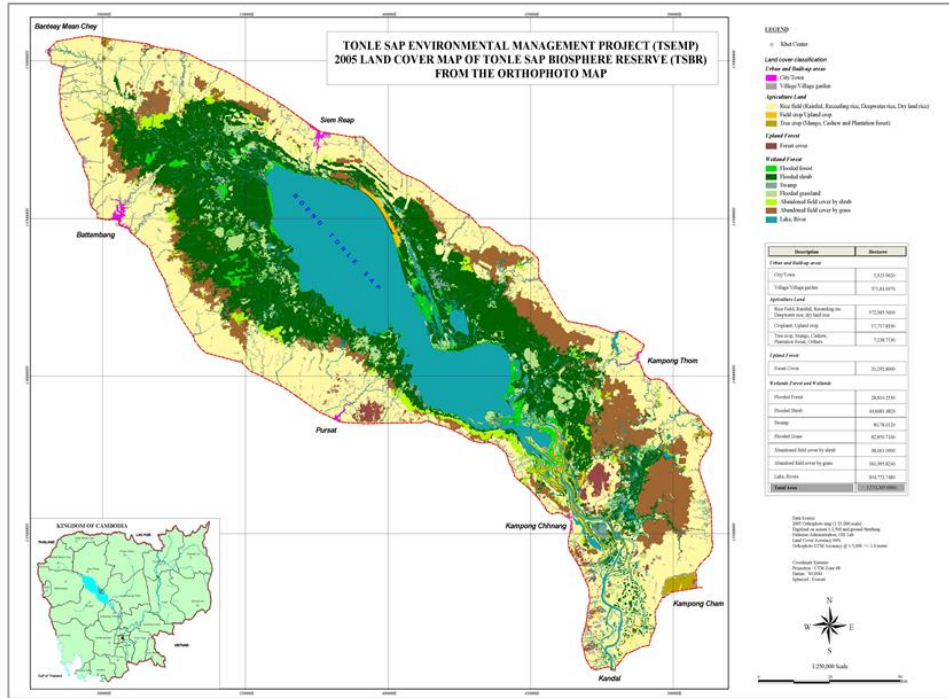


## 2.1.3 EEZ



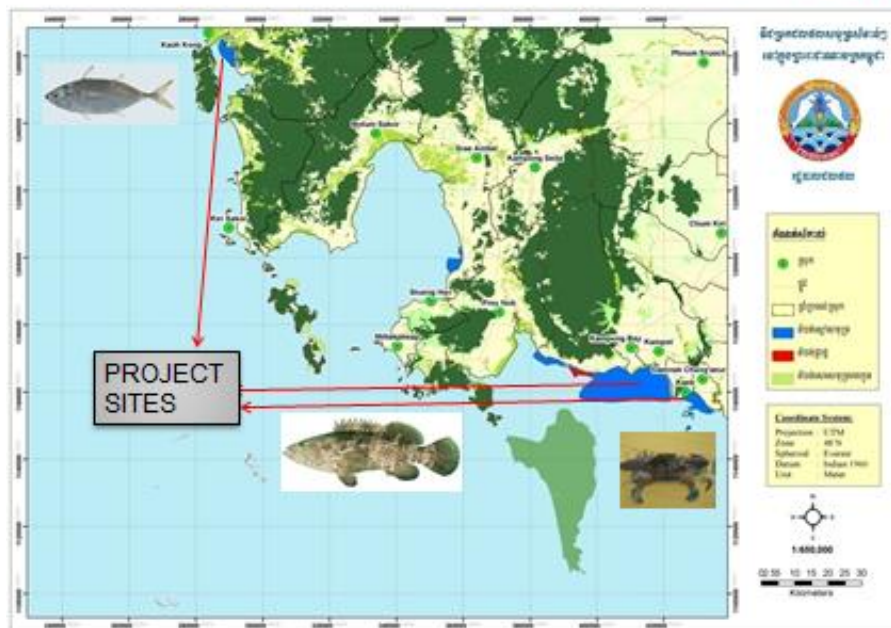


## 2.1.4 Flooded forest/scrub areas in the Tonle Sap Biosphere Reserve

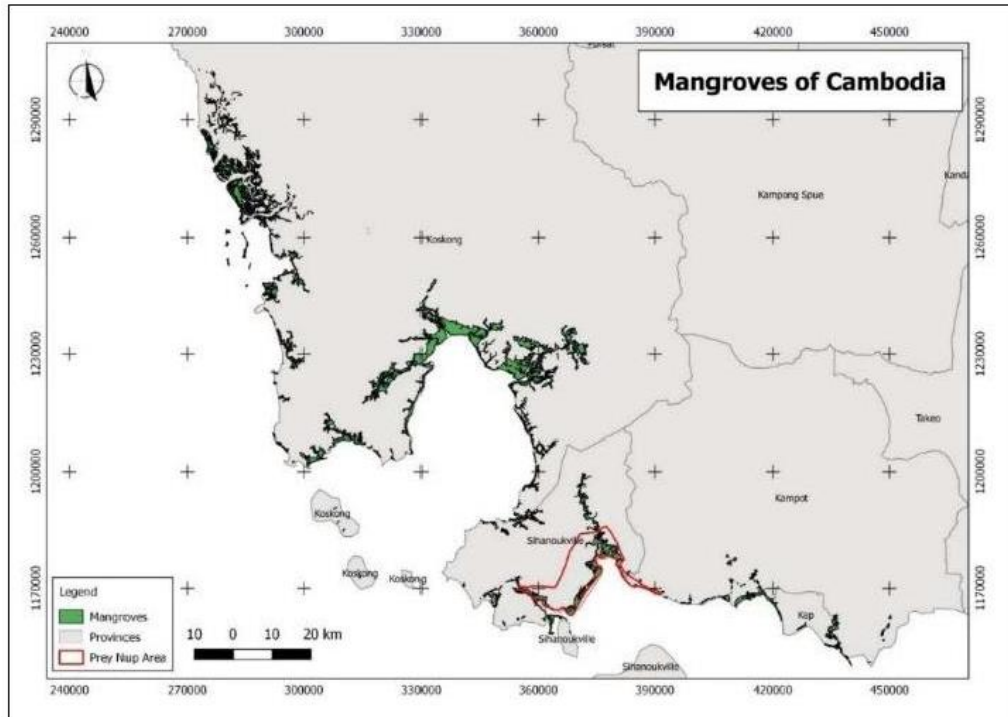


## 2.1.5 Marine refugias

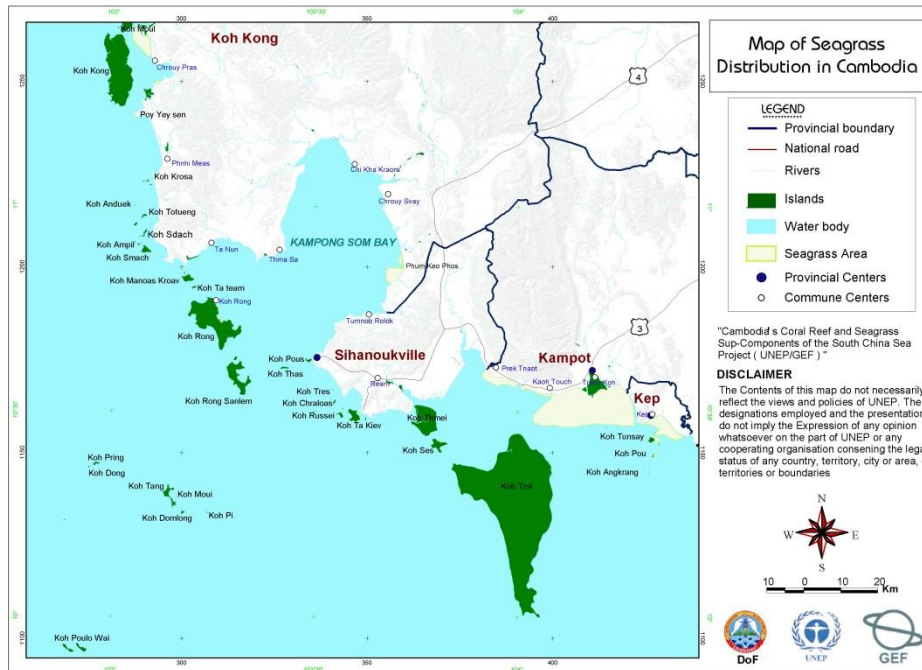
### Project Sites in Cambodia



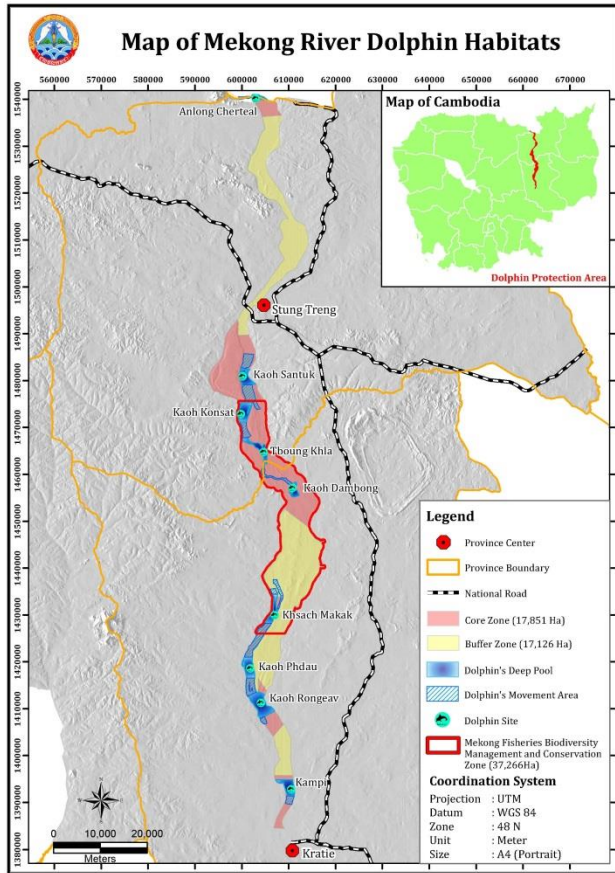
## 2.1.6 Mangrove forest areas in the Cambodian Coast



## 2.1.7 Sea grass beds in the Cambodia



## 2.1.8 Map of Mekong Dolphin conservation areas



### Annex 3. Endangered fish and other aquatic species of the Kingdom of Cambodia

| No. | Local name                       | Scientific name                     | Commercial name                         | CITES |
|-----|----------------------------------|-------------------------------------|---|-------|
| 1   | Trey Taport or Trey Neak         | <i>Scleropages formosus</i>         | Asian bonytongue                        | I     |
| 2   | Trey Thkor                       | <i>Pristis microdon</i>             | Sawfish                                 | II    |
| 3   | Trey Bei Kamnat or Trey Khla     | <i>Puntius partipentazona</i>       | Tiger barb                              |       |
| 4   | Trey Kiet Srong                  | <i>Balantiocheilos melanopterus</i> | Bala sharkminnow                        |       |
| 5   | Trey Kuchrea                     | <i>Puntioplites bulu</i>            |   |       |
| 6   | Psaot Kbal Tralaok               | <i>Orcaella brevirostris</i>        | Irrawaddy dolphin                       | I     |
| 7   | Trey Reach                       | <i>Pangasianodon gigas</i>          | Mekong giant catfish                    | I     |
| 8   | Trey Kol Raing                   | <i>Catlocarpio siamensis</i>        | Giant barb                              |       |
| 9   | Trey Trasak Krahorm              | <i>Probarbus jullieni</i>           | Isok barb                               | I     |
| 10  | Trey Trasak                      | <i>Probarbus labeamajor</i>         | Thicklip barb                           |       |
| 11  | Trey Trasak Sar                  | <i>Probarbus labeaminor</i>         | Thinlip barb                            |       |
| 12  | Andeuk Luong or Andeuk Sorsai    | <i>Batagur baska</i>                | Mangrove terrapin or estuarine terrapin | I     |
| 13  | Trey Trachiek Damrei             | <i>Osphronemus exodon</i>           | Elephant ear gourami                    |       |
| 14  | Trey Romeas                      | <i>Osphronemus goramy</i>           | Giant gourami                           |       |
| 15  | Trey Kantrab Khla                | <i>Datnioides undecimradiatus</i>   | Narrow barred tigerperch                |       |
| 16  | Trey Kbork                       | <i>Tenualosa thibaudeaui</i>        | Laotian shad                            |       |
| 17  | Trey Kanchos Krabei              | <i>Glyptothorax fuscus</i>          |   |       |
| 18  | Trey Stok                        | <i>Wallago leeri</i>                |   |       |
| 19  | Andeuk Sankal                    | <i>Heosemys annandalii</i>          | Yellow-headed temple turtle             | II    |
| 20  | Andeuk Ka-ek                     | <i>Siebenrockiella crassicollis</i> | Black marsh turtle                      | II    |
| 21  | Trey Krabei                      | <i>Bagarius bagarius</i>            | Dwarf goonch                            |       |
| 22  | Trey Krabei                      | <i>Bagarius suchus</i>              | Crocodile catfish                       |       |
| 23  | Trey Krabei                      | <i>Bagarius yarrelli</i>            | Goonch                                  |       |
| 24  | Trey Chhmarkrapeu                | <i>Lycotrissa crocodilus</i>        | Sabertooth thryssa                      |       |
| 25  | Krapeu Trey                      | <i>Crocodylus siamensis</i>         | Siamese crocodile                       | I     |
| 26  | Andeuk Sre                       | <i>Malayemys subtrijuga</i>         | Rice-field terrapin                     | II    |
| 27  | Andeuk Saom                      | <i>Heosemys grandis</i>             | Asian giant terrapin                    | II    |
| 28  | Kantheay Asie                    | <i>Amyda cartilaginea</i>           | Asiatic soft-shell turtle               | II    |
| 29  | Kantheay Kbal Kangkeb            | <i>Pelochelys cantorii</i>          | Asian giant soft-shell turtle           | II    |
| 30  | Krapeu Samot                     | <i>Crocodylus porosus</i>           | Estuarine crocodile                     | I     |
| 31  | Chruk Toek or Poyung             | <i>Dugong dugon</i>                 | Dugong                                  | I     |
| 32  | Trey Sekbok                      | <i>Cheilinus undulates</i>          | Humphead Wrasse                         | II    |
| 33  | Balen Krabei                     | <i>Pseudorca crassidens</i>         | False killer whale                      | II    |
| 34  | Belen Kbalthom                   | <i>Globicephala macrorhynchus</i>   | Short-finned pilot whale                | II    |
| 35  | Psoat Chramos Dorb Champus Khlei | <i>Tursiops aduncus</i>             | Indo-Pacific bottlenose dolphin         | II    |
| 36  | Psoat Kbal Traloak               | <i>Orcaella brevirostris</i>        | Irrawaddy dolphin                       | I     |
| 37  | Psoat Chramos Dorb Champus Veng  | <i>Tursiops truncatus</i>           | Common bottlenose dolphin               | II    |
| 38  | Psoat Khleach                    | <i>Sousa chinensis</i>              | Indo-Pacific hump-                      | I     |

|    |                              |  |                                |           |
|----|------------------------------|--|--------------------------------|-----------|
|    |                              |  | backed dolphin                 |           |
| 39 | Psoat Chhnoat Pnek           | <i>Stenella longirostris roseinventris</i> | Dwarf spinner dolphin          | <i>II</i> |
| 40 | Psaot Ouch                   | <i>Stenella attenuata</i>                  | Pantropical spotted dolphin    | <i>II</i> |
| 41 | Psoat Et Pruy Knong          | <i>Neophocaena phocaenoides</i>            | Finless porpoise               | <i>I</i>  |
| 42 | Psoat Kmao Leung             | <i>Dolphinus capensis tropicalis</i>       | Long-beaked common dolphin     | <i>I</i>  |
| 43 | Lmich                        | <i>Chelonia mydas</i>                      | Green turtle                   | <i>I</i>  |
| 44 | Krass                        | <i>Eretmochelys imbricata</i>              | Hawksbill turtle               | <i>I</i>  |
| 45 | Lmich Pruy Bei or Lmich Speu | <i>Dermochelys coriacea</i>                | Leatherback turtle             | <i>I</i>  |
| 46 | Lmich Kbal Thom              | <i>Caretta caretta</i>                     | Loggerhead turtle              | <i>I</i>  |
| 47 | Lmich Praphes                | <i>Lepidochelys olivacea</i>               | Olive ridley turtle            | <i>I</i>  |
| 48 | Krum Yeak                    | <i>Tridacna squamosa</i>                   | Fluted giant clam              | <i>II</i> |
| 49 | Krum Yeak                    | <i>Tridacna maxima</i>                     | Elongate giant clam            | <i>II</i> |
| 50 | Krum Yeak                    | <i>Tridacna crocea</i>                     | Crocus giant clam              | <i>II</i> |
| 51 | Krum Yeak                    | <i>Tridacna gigas</i>                      | Giant clam                     | <i>II</i> |
| 52 | Kyong Koad                   | <i>Trochus niloticus</i>                   | Commercial top                 |           |
| 52 | Kyong Kuch or Kyong Prak     | <i>Turbo marmoratus</i>                    | Green turbo or green snail     |           |
| 54 | Ses Samut (fish)             | <i>Hippocampus spp.</i>                    | Sea horse                      | <i>II</i> |
| 55 | Pkar Thmor                   | <i>Anthozoa spp.</i>                       | Corals and sea anemones        |           |
| 56 | Pralaing Kas                 | <i>Tachypleus gigas</i>                    | Triangular-tail horseshoe crab |           |
| 57 | Kachoar                      | <i>Carcinoscorpius rotundicauda</i>        | Mangrove horseshoe crab        |           |
| 58 | Trey Banon Kingkork          | <i>Rhincodon typus</i>                     | Whale shark                    | <i>II</i> |

## Annex 4. FiA Department mandates

|   |   |
|---|---|
| <p><b>Mandate of the Department of Fisheries Conservation<sup>43</sup></b></p> <p>Fisheries Conservation Objective: Sustainable fisheries resources through protection and conservation are realized to ensure sustainable utilization.</p> <p>Key mandates</p> <p>Studying, identifying, establishing and conserving the fisheries conservation and habitats</p> <p>Studying, identifying, establishing and conserving of fisheries endangered species</p> <p>Rehabilitation and protection of flooded forest and mangrove forest areas</p> <p>Key actions</p> <p>Identify critical or threatened aquatic habitats and design and implement appropriate policy, legislative and action-related measures to isolate, protect and rehabilitate them.</p> <p>Identify critical or threatened aquatic species, where species are threatened, protect them and take appropriate steps to return their abundance to acceptable and non-endangered levels.</p> <p>Raise awareness amongst resource users about the fragility of the aquatic systems and endangered species and about the laws to protect and conserve those resources.</p> <p>Enhance fish stocks through the release of fish into the wild (including the culture and release of endangered species), through the use of refuges in communities and through conservation measures and areas.</p> | <p><b>Mandate of the Department of Community Fisheries Development<sup>44</sup></b></p> <p>Community Fisheries Development Objective: Encourage and facilitate the establishment and development of Community Fisheries</p> <p>Develop the research framework related to socio-economic and Community Fisheries development</p> <p>Support the demarcation of CFi fishing area boundary and setup fish conservation in the CFi fishing area</p> <p>Collaborate in identifying CFi fishing area and resolve conflict in the CFi</p> <p>Collaborate and coordinate with relevant institutions, Partners, and communities in order to strengthen the capacity and the development of the CFi</p> <p>Monitor and evaluate the performance of the CFi</p> <p>Facilitate the preparation of the CFi by law, CFi internal rules, CFi fishing agreement, CFi management plan, and CFi registration.</p> <p>Encourage implementation of livelihood activities in the CFi which have no negative impact on the fisheries resources</p> <p>Implement other tasks assigned by the head.</p> |
| <p><b>Mandate of the Department of Fisheries Affairs</b></p> <p>Mapping and demarcation of the boundary fisheries domain</p> <p>Restore and improve fisheries domain</p> <p>Define the areas for permitting flora plants in fisheries domain.</p> <p>Preparing fishing log back, vessel log back and investment documents, bidding or renting fishing lot and define fishing lots fees.</p> <p>Control and cooperation to solve conflict/ issues related to fisheries exploitation.</p> <p>Monitor and evaluate the situation of fisheries exploitation + fisheries domain.</p> <p>Manage/ arrange permitted fishing license and the use of boat + canoe and vessels.</p>   | <p><b>Mandate of the Department of Aquaculture Development, Division of Community Fish Refuge Pond</b></p> <p>Develop the activity plans and formal letter for managing and developing community fish refuge pond</p> <p>Determine the potential area to expand the community fish refuge pond</p> <p>Research on technology for managing and developing the community fish refuge pond.</p> <p>Establish and manage the community fish refuge pond.</p> <p>Process data, training on establishing and manage the development of community fish refuge pond and result for community fish refuge development.</p> <p>Training and extension on the establishing and managing the development of community fish refuge pond.</p> <p>Produce quarterly report, semester report, nine report and annual report on department activities and result.</p> <p>Implement other tasks assigned by department leaders.</p>   |

<sup>43</sup> Provided by Ouk Vibol, Director, DFC

<sup>44</sup> Sub-decree no. 188 or nor kro dated on 14 Nov. 2008 translated by Ly Vuthy

