

**KINGDOM OF CAMBODIA  
NATIONAL RELIGION KING**



**INUNDATED FOREST FIRE PREVENTION  
AND MANAGEMENT PLAN  
BANTEAY MEANCHEY PROVINCE  
2022 - 2026**



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**FISHERIES ADMINISTRATION AND BANTEAY MEANCHEY ADMINISTRATION**

## Preface

The Kingdom of Cambodia is rich in natural resources, especially the Tonle Sap Lake that consists of many freshwater lives such as fishes, turtles, reptiles, water birds, aquatic plants and inundated forest, which are the matters of utmost importance to humanity and to maintain the natural balance. These resources not only play a vital role in supplying fish daily to Cambodians but also to protect and conserve the Tonle Sap basin and grant tourism services.

The Royal Government of Cambodia has taken significant policy measures addressing the sustainable protection, conservation and management of fisheries resources and the aquatic ecosystems on which many Cambodian households, most importantly for those living in rural areas around the Lake, depend for livelihoods, employment, income, food security and nutrition.

The 10-year Strategic Plan for Fisheries Conservation and Management under the pillar 1 of Capture Fisheries and Management of the Strategic Planning Framework for Fisheries covering the years 2015-2024, continues its efforts to pursue a vision of “Cambodia’s fisheries resources and ecosystems are restored where depleted, conserved and protected for livelihoods, food security and nutrition for present and future generations”.

Banteay Meanchey province consists of a part of the floodplain the lake of the Tonle Sap Lake that has high potential for promoting economic development through fishing, agricultural production and ecotourism development. Due to the geographical situation of Banteay Meanchey province, rich in biodiversity and situation of flooded forest fire occurred every year that negatively affect to fisheries habitat and fisheries stock, Fisheries Administration in close collaboration with CAPFISH’s FAO Complementary Support project, provincial administration and local authorities, develops the 5-Year Inundated Forest Fire Prevention and Management Plan for Banteay Meanchey province for implementing from 2022 - 2026.

To meet the above vision, on behalf of the Fisheries Administration of the Ministry of Agriculture, Forestry and Fisheries, I fully support the implementation of this an important management plan to ensure sustainable management of inundated forest fire and restoration for the sake of fisheries conservation, fisheries biodiversity and the contribution to local poverty reduction to meet the standard of living for our people.

And on behalf of Banteay Meanchey Administration, I sincerely support and officially declare to launch the 5-Year Inundated Forest Fire Prevention and Management Plan for Banteay Meanchey province from this day forwards. The provincial authorities will fully support the implementation of this management plan to make sure our fisheries resources can support our next generations in years to come.

Phnom Penh, date *October 24, 2022*



**H.E. Poum Sotha**  
Delegate of the Royal Government  
Director General of Fisheries Administration

Banteay Meanchey, date *Nov 11, 2022*



**H.E. Oum Reatrey**  
Governor  
Banteay Meanchey province



## Acknowledgement

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This inundated forest fire prevention and management plan for Banteay Meanchey province has benefited from inputs of those involve in working in the Tonle Sap region such as UNESCO, FACT and WCS shared details of their work in Tonle Sap.

Finally, I would also like to thank the EU Delegation to Cambodia for their interest and support, most notably that H.E. **Carmen Moreno**, Ambassador of the European Union, Mr. **Bryan Fornari** , Head of Cooperation of the EU Delegation, and **Sebastien Copin**, Attaché of EU Delegation, CAPFISH-Capture and Co-Chair of the TWGF for their support. Funding support for this work was provided by the European Union's Delegation to the Kingdom of Cambodia through the MAFF to FiA for the CAPFISH-Capture Project.

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## **Acronyms and abbreviations**

BMC	: Banteay Meanchey
BTB	: Battambang
CAPFISH	: Cambodia Programme for Sustainable and Inclusive Growth in the Fisheries Sector
CBFIM	: Community Based Fisheries Management
FFPT	: Flooded Forest Fire Patrol Team
CFi	: Community Fisheries
CFiMC	: Community Fisheries Management Committee
DCF	: Department of Community Fisheries
DFA	: Department of Fisheries Affairs
DFC	: Department of Fisheries Conservation
FAO	: Food and Agriculture Organization of the United Nations
FiA	: Fisheries Administration
FiAC	: Fisheries Administration Cantonment
IFFPMP	: Inundated Forest Fire Prevention and Management Plan
KCN	: Kampong Chhnang
FCA	: Fisheries Conservation Area
KTM	: Kampong Thom
MAFF	: Ministry of Agriculture, Forestry and Fisheries.
MET	: Monitoring and Evaluation Team
MoE	: Ministry of Environment
PDAFF	: Provincial Department of Agriculture, Forestry and Fisheries.
PDE	: Provincial Department of Environment
PDoRAM	: Provincial Department Water Resources and Meteorology
PS	: Pursat
SMS	: Short Messaging Service
SR	: Siem Reap
TSA	: Tonle Sap Authority
UNESCO	: United Nations Educational, Scientific and Cultural Organization
WGFFFM	: Working Group for Flooded Forest Fire Management

## **1. Introduction**

The Tonle Sap Lake is described by Cambodians as the heart of their culture and national economy. Globally, it is known as the heart of Cambodia's freshwater fisheries, the largest freshwater lake in Southeast Asia and one of the most productive wetland areas in the world. The flooded forests and floodplains surrounding the Lake provide favorite shelters for fish and some of the world's most threatened water birds to access to spawning, breeding and feeding. According to the Fisheries Administration (FiA), fish captured from the Tonle Sap Lake provide over 80% of protein intake in the Cambodian diet.

As Cambodia's population and economy continue to grow steadily, competition of human in harvesting fisheries resources and deforestation of flooded forests for agricultural purposes, the fisheries resources in Tonle Sap Lake Region are being threatened day by day and affected negatively on fishes, wildlife, water birds and biodiversity of the Tonle Sap Lake.

In the last few years, the water level of the Tonle Sap Lake has reached low levels due to climate change, especially increase in heat, drought and storms. These factors exacerbate flooded forest fires and as a result, adversely affect Fisheries Conservation Areas (FCAs), fish and water bird refuges for spawning, breeding and food supply, particularly Prek Toal Ramsar site, the largest bird sanctuary in Southeast Asia.

There are two main factors of intentional and negligent human activities considered to be the causes of flooded forest fires in Tonle Sap's floodplains are due to accidental and intentional human activities. The accidental cases causing flooded forest fires include using fires to harvest bee honey, discarding lit cigarette butts, and leaving cooking fires without putting them out. The intentional cases are cutting and burning flooded forests to grab the land for agricultural purposes, burning dry water hyacinth for hunting turtle wildlife and clear shrubs for paving paths to place fishing gears so-called Bor and small Dai) across streams.

The flooded forest fire is the most serious threat to flooded forest. Since the inundated forest is the key breeding and feeding grounds for fish and water birds, the loss of flooded forests will lead to the decreases in both species and population of fishes, reptiles and birds. If flooded forest was burned repeatedly it would turn into grasslands.

Similarly, the consequence of flooded forest wildfires in Tonle Sap's floodplains in the province have contributed significantly to the gradual decline in fisheries resources, including population and species of fishes, aquatic plants, birds, reptiles and mammals and lastly impact on livelihoods of fishing communities.

Seeing this consequence the Fisheries Administration (FiA), in collaboration with the FAO's complementary component of the CPAFISH project being implemented "Cambodia Programme for Sustainable and Inclusive Growth in the Fisheries Sector - CAPFISH-Capture" has identified and worked with key stakeholders involved in flooded forest fire management provincial, district, commune and community levels in Banteay Meanchey province to prepare and implement Inundated Forest Fire Prevention and Management Plan (IFFPMP) in order to reduce risks of flooded forest fires in the province. That is why the IFFPMP is developed in a participatory manner to ensure the timely responses or interventions will be implemented flexibly and smoothly.

A technical team, consisting of 12 officers from Department of Fisheries Conservation (DFC) of Department of Fisheries Affairs (DFA) and Fisheries Administration of FiA, Fisheries Administration Cantonment (FiAC), and the FAO's technically advisory team visited burnt flooded forest sites, gathered primary and existing data/ information at local level to prepare the IFFPMP for implementation at district and provincial levels.

The field missions were launched in June 2021 to meet relevant communities and stakeholders in target communes and districts to gather information on causes of and actions taken against flooded forest fires, institutions involved in prevention and extinguishment of flooded forest fires, existing mechanism for flooded forest fire management and its effectiveness, flooded forest restoration approaches, the need of equipment and physical infrastructure for preventing and fighting flooded forest fires. Meanwhile, GPS coordinates of burnt flooded forest sites were collected for mapping.

## **2. Overview of geography, social-economics and biodiversity in BMC province**

### **2.1 Overview of geography and social-economics of Bantray Meanchey province**

Province covers a total area of 667,817ha in the northwestern part of Cambodia, 360 kilometers from Phnom Penh capital. This province is the 13th largest province in the Kingdom of Cambodia based on land

area and the 10th largest province in terms of total population, a province with significant economic potential in the northwest.

The province borders Banteay Ampil and ChongKal district of Oddar Meanchey province, and Buriram province of Thailand to the north; Srey Snom and Kralanh districts of Siem Reap province to the east; Sapou Loun, Bavel, ThmarKoul and Aek Phnom districts of Battambang province to the south; and Sa Kaeo province of Thailand to the west. The province has two municipalities, Serei Sophorn and Poipet, located in the west as an international border crossing points between Cambodia and Thailand.

The province is divided administratively into 2 municipalities, 7 districts, 10 Sangkats, 55 communes and 722 villages. The province's total population is 815,522 (406,481 females) equivalent to 194,863 households with an average annual rate of population growth of 0.55%. 66.90% out of the total population are farmers mostly dependent on agricultural production, including long-term agriculture (rubber, oil palm tree, cashew, mango, durian, longan, Pursat orange, black pepper and sugar cane), short-term agriculture (rice, corn, cassava, sweet potato, peanut, soybean, mungbean and sesame), animal husbandry (cow, buffalo, goat, pig, chicken and duck), fishing (0.33%) and aquaculture (crocodile, fish, shrimp and lobster). (Source: Socio-Economic Situation Document, Banteay Meanchey province 2020, Provincial Department of Planning).

Based on the provincial geography, most of the province's total area is covered by plateau with some mountains in the north and the east. A small portion (about 12% of the total area) to the southeast in Preah Netr Preah and Mongkol Borey districts is Tonle Sap's floodplain where consist of flooded forests that are mostly in Zone 3.

There are two main streams of Mongkol Borey and the Serei Saophoan in the province. Mongkol Borey stream originates from 1,470-meter-high Sai Khao mountain in Thailand, receives additional rainfall from Serei Saophoan stream, which originates in Thailand, before flowing into Sangkae stream originates from 700-meter-high Talor mountain in Battambang province before finalizing flowing into Tonle Sap Lake.

## **2.2 Status of biodiversity in the floodplains of Banteay Meanchey province**

Banteay Meanchey province is one the six provinces around Tonle Sap Lake that has the least floodplain area and its border is not directly adjacent to the Lake. The floodplains located in the western part of the province are in Preah Netr Preah and Mongkol Borey districts, covering about 15% of the province's total land area of the province. The management of the fisheries sector of the Fisheries Administration Cantonment (FiAC) in the province has progressed year by year. The major fisheries activities of the FiAC include management of Fish Conservation Areas (FCAs), community fisheries, community fish refuges, freshwater aquaculture, and inspections of fisheries product transportation across the province.

According to Sub-Decree No. 197 dated on 29 August 2011, the flooded forest in Zone 3 within Banteay Meanchey province is 12,047 hectares and Sub-Decree No. 106 dated 31 May 2022 on the cutting out of 58 hectares, 16 Acre and 68 Cent of Zone 3 into Zone 2 of Tonle Sap Area, Banteay Meanchey province for local people use and dependency. The province has 19 CFIs, 54 community fish refuges and 2 Fisheries Conservation Areas.

Among the 19 CFIs, Koh Pong Sat CFI established in 2001, covering a total area of 4,867 ha as part of Serei Saophoan stream, is located in Koh Pongsat village, Preah Ang and Snay Dangkot villages of Koh Pongsat commune, Serei Sophorn municipality, known as one of the most popular ecotourism sites in the province because there have been many national and international tourists visited and fed brood stocks (large fishes) such as *Hypsibarbus lagleri*, *Siamese flying fox*, *Toli shad*, *Blackspotted catfish*, *Thynnichthys thynnoides*, *Labeo chrysophekadion*, *Pangasius larnaudii*, *Pangasius micronemus*, *Chitala blanci*, *Notopterus notopterus*, *Lobocheilos melanotalnia*, *Channa striata*, *Clarias batrachus*, and so forth that gather at Phneat pagoda. During flood season, the brood stocks migrate along natural waterways and across rice fields, grasslands and flooded forests to breed, lay eggs and spread fingerlings throughout the provincial floodplain.

Before 1999, Banteay Meanchey province had 3 fishing lots (fishing lot No.1, No.2 and No.3). In 2000, fishing lot No.3 was abolished to expand the size of public fishing grounds for fishing communities. In 2012, the two remaining fishing lots were removed, allocating the high value biodiversity areas as FCAs (Rohal Kampring FCA in former fishing lot No.1 and Rohal Steung Kambot FCA in former fishing lot No.2), and another part for increasing the size of public fishing ground area in accordance with the wishes of fisherfolks.



Before 2010 about 65% of the province's total floodplain area was covered of flooded forest but now about 90% of the floodplain area is covered by paddy fields of rainfed rice, dry season rice, receding rice, floating rice and irrigation system (reservoirs and canals) constructed to support the rice production there. Apart from rice, there are a few small-scale secondary cropping of sesame, pumpkin and watermelon.

Apart from the paddy fields, about 10% of the total floodplain area is flooded forests, most of them are in the CFis and FCAs and along the streams. The remaining flooded forest in Zone 2 is about 200 hectares in Rohal commune of Preah Netr Preah district and the rest in Zone 3.

As for the flooded forest aspect within the CFi management areas, 90% of the total flooded forest area is dominated by wood shrubs with species of *Gardenia ankorensis*, *Ixora cuneifolia*, *Antidesma ghasembilla*, *Gmelina asiatica*, *Croton caudatus*, *Phyllanthus lasodiifolus*, *Bridelia ovata*, *Breynia rhamnoides*, *Dasymaschalon lomentaceum*, etc.) and another 10% are flooded forests with species of *Barringtonia asiatica*, *Terminalia Cambodiana*, *Mitragyna bruninisa* and *Coccoceras anisopodum* standing scatteringly in the shrubs at about 25-50 meters apart and 30-cm tree density of about 16 trees/hectare.

Despite the regular protection by the CFis, the flooded forests are still under threat by land encroachment for farming and yearly forest fires mostly caused by burning flooded forests for claiming lands and neglectful activities of cooking and harvesting honey bee. Flooded forest fires have been seen frequently in Phnum Liep and Prasat communes of Preah Nets Preah district and Sambuor commune of Mongkul Borei district. There were only a few cases of flooded forest fires in Rohal commune of Preah Netr Preah district as the flooded forests situated near the village, making easy to prevent and extinguish.

The yearly repeated occurrences of flooded forest fires profile, resource structure, flooded forest cover resources and ecosystems. It means the density of flooded forests decrease but wood shrubs (ground layers) increase. Herbs, vines and grasses also increase in areas with little or no shrubs.

Based on the situation and biodiversity in the province, especially the presence of flooded forests and the occurrence of flooded forest fires, two out of the seven districts, namely Preah Netr Preah and Mongkol Borey, are identified and selected as target district for implementing the IFFPMP. The following sections describe the situation of flooded forests and flooded forest fires at commune level to identify and select target communes to implement the IFFPMP.

### **3. Overview of geography, social-economics and biodiversity in target districts**

Preah Netr Preah and Mongkol Borey districts are selected as the target districts and this section will confirm the features to be presented and analyzed to identify target communes in each of the districts that will directly participate in the IFFPMP's implementation in the next five years.

#### **3.1 Overview of geography, social-economics and biodiversity in Preah Netr Preah district**

##### **3.1.1 Overview of geography and social-economics in Preah Netr Preah district**

Preah Net Preah district is located in the southeast of the province, about 29 km from Serei Saophaon municipality. It borders on the north by Phnom Srok and Svay Chek districts of Banteay Meanchey province, on the east by Kralanh district of Siem Reap province, on the south by Aek Phnom district of Battambang province, and on the west by Serey Sophorn municipality and Mongkol Borey district of Banteay Meanchey province.

The district is divided into 9 communes and 130 villages with a total population of 109,955 people (54,947 women) equal to 25,218 families, of which 81.60% are farmers engage in short and longterm agriculture (rice, corn, mungbean, peanuts, sesame, cassava, sugar can, rubber, cashew and mango), animal husbandry (cows, buffaloes, pigs, goats, chickens and ducks), aquaculture (fish and crocodiles) and fishing (1.4%). In addition, 17.40% of the total population engage in service delivery civil servants, company employees, NGO staff, factory and construction workers, businessmen, repair of electrical devices and machinery, etc.), and another 1% are involve in handicrafts such as furniture and sculptures.

In the field of agriculture, especially rice production, the district has a total area of 68,008 ha of paddy fields, including rainfed rice, dry season rice, receding rice and upland rice, of which 12,870 ha is dry season rice fields with an average yield of 3.40 tons/ha and 56,143 ha is rainfed rice fields with an average yield of 1.70 tons/ha.

About 30% out of the total area of the dry season rice land in the district is located in the north, above National Road No.6, which receive water from two major irrigation dams of Ang Trapeang Thmor dam in Phnom Srok District of Banteay Meanchey Province and Steung Sreng II "Ato" in Chong Kal district of Oddar Meanchey province, whereas about another 70% is located in zone 2 and 3, which receives water from the Mongkol Borey and Serei Saophoarn streams and irrigation systems set up there.

### 3.1.2 Overview of biodiversity and flooded forest fires in Preah Netr Preah district

Based on the geographical location and the current presence of fishery resources, especially flooded forests and the risk of flooded forest fires, five out of the nine communes in Preah Net Preah district where some parts of their residential lands are located in and adjacent to the Lake's floodplains and almost all of their farmers living in these communes engage in uses of the lands and fishery resources in the floodplains. The five communes are Prasat, Phnum Liep, Rohal, Preah Netr Preah and Chnuor Mean Chey

Preah Netr Preah district has nine Community Fisheries (CFis) covering a total area of 40,192 hectares located in Preah Netr Preah, Phnum Liep, Prasat commune and Rohal communes; one Fishery Conservation Area (FCA), so-called Rohal Steung Kambot, covering 171 hectares; and one brood stock and wild bird conservation area (Rohal Keh). Among all of the CFis and conservation areas, only five CFis have flooded forest (Table 1). In addition, the district consists of 7 other community fish refuges in Preah Netr Preah, Chob Vary, Tean Kam and Bos Sbov communes.

**Table 1: List of CFis and FCAs in Phreah Netr Preah district, which consist of flooded forests**

No	Community Fisheries and Fisheries Conservation Areas	Communes	Area (ha)	Existing flooded forest area (ha)
1	Dangkeab Khdam CFi	Prasat	14,300	≈ 1,000
2	Tumnub Ou Ta Som	Phnum Lieb	6,700	≈ 700 ha
3	Stueng Kambot Meanchey CFi	Rohal	2,660	< 500 ha
4	Kambaor CFi	Phnum Lieb	6,870	< 300 ha
5	Ou Runteah Banh CFi	Preah Netr Preah	4,867	< 100 ha
6	Rohal Steung Kambot FiCA	Preah Netr Preah & Rohal	78	≈ 40
7	Rohak Keh FCA	Chnuor Mean Chey	30	25 ha
8	Rohal Lech Srah CFi	Preah Netr Preah	2,168	No flooded forest
9	Koymeng Preah Netr Preah CFi	Preah Netr Preah	1,376	No flooded forest
10	Ta Lom Preah Netr Preah CFi	Preah Netr Preah	1,228	No flooded forest
11	Samaki Mean Chey CFi	Rohal and Chob Vari	23.3	No flooded forest

Rohal Steung Kambot FCA is located along Kambot stream (in the former fishing lot No. 2) in Preah Netr Preah and Rohal communes. As it is in a wetland and regularly protected by the Preah Netr Preah's FiA division, high and big flooded forest with high density of trees about 150 trees/ha and diameter (DBH) between 20cm to 70cm. The big flooded tree species include *Barringtonia acutangula* (dominant species), *Terminalia Cambodiana*, *Peltophorum dasyrachis*, *Garcinia loureiri* and *Mitragyna bruninisa*. *Peltophorum dasyrachis* species mainly grow along the stream banks.

According to a report from Preah Net Preah's FiA Division, in 2018, about 5-hectare flooded forest fire case in occurred in this FCA.

The situation of flooded forest and flooded forest fire in the relevant communes in the district is summarized as follows:

- **Chhnour Meanchey Commune:** The commune consists of about 25ha of high flooded forests in Rohal Keh brood stock conservation area and another 30ha in Ou Avien wildbird conservation area in Ropeak village with a total area of about 30 hectares. Both conservation areas under the jurisdiction of the commune authorities through the direct management of the concerned management committees that were elected freely and transparently by the villagers. Due to the small areas, the community manages and protects the flooded forests well from wildfires, particularly they are surrounded by Ou Avien stream as an effectively natural firebreak.
- **Preah Netr Preah commune:** Very few flooded forests remain in the commune scattering along the natural streams and their tributaries surrounding by paddy fields, so no any case of flooded forest fire has been happened there so far. However, because of a large number of families in the commune possess some plots of land being used for rice cultivation located adjacent and near the remaining forest in Zone 3, the local authorities and the FiAC require the communities living in this commune participate in preventing flooded forest encroachment and flooded forest fire

management, particularly in extension meetings on and further dissemination to the public about participatory flooded forest fire prevention and extinguishing.

- **Rohal commune:** consists of two CFIs, but only one CFI of Steung Kambot Meanchey CFI has flooded forests dominated by shrubs with the height of about 4 meters and canopy of about 80%. Flooded trees of *Barringtonia acutangula*, *Terminalia Cambodiana*, *Peltophorum dasyrachis*, *Garcinia loureiri* and *Mitragyna bruninisa*. *Peltophorum dasyrachis* species with diameters of up to 50 cm congregate along the stream banks and stand dispersedly in the shrubs.

Since the flooded forests are near the village and being regularly protected by the CFI, flooded forest fires and flooded forest clearance for farming in the commune have been rarely happened.

- **Phnum Leap and Prasat communes:** Only three CFIs in the two communes consists of flooded forests that have similar situation in terms of land use and forest cover classes. Prasat commune has only one CFI of Dangkiep Kdam Meanchey has about 1,000 hectares of flooded forest, while Phnum Liep commune has two CFIs: Ou Ta Som CF has about 700ha and Kambaor CFI has about 300ha of flooded forest.

The flooded forests cover almost the entire areas of the three CFIs. Big flooded forest species (*Barringtonia acutangula*, *Mitragyna bruninisa*, *Xanthophyllum glancam*, *Terminalia Cambodiana* and *Peltophorum pterocarpum*) with DBH up to 50cm stand scatteringly amid woody shrubs that have about 80% of canopy. There are many plots of grasslands where are temporary shelters for cattle herders in the dry season because those sites consist of lakes/ponds and water for catles and herders. The herders are considered as one of the target groups who suspectedly caused flooded forest fires.

Compared to other communes and CFIs in the district, Phnum Liep and Prasat communes have the most flooded forests. Due to the the flooded forests in the CFIs located far way from the village and lack of budget and transportation for controlling illegal forest clearance and preventing flooded forest fires, the three CFI management committees are unable to conduct regular patrols, giving opportunities for offenders yo clear and burn flooded forests frequently.

## 3.2 Overview of geography, social-economics and biodiversity of Mongkol Borey district

### 3.2.1 Overview of geography and social-economics of Mongkol Borey district

Mongkol Borey district is located in the south of the province, about 29 km from Serey Saophoan municipality. It is bordered on the north by Ou Chrov and Preah Nets Preah districts and the municipality of the province, on the east by Preah Netr Preah district, on the south by Thma Koul and Bavel districts of Battambang province, and on the west by Malai district of Banteay Meanchey province.

The district is divided into 13 communes and 157 villages with a total population of 177,750 people (89,500 women) equal to 41,982 families, of which 70% engaged in agricultural production as the main occupation, which includes short-term and long-term agriculture (rice, corn, mungbean, peanut, sesame, cassava, sugar cane, rubber, cashew, mango and Pursat orange), animal husbandry (cows, buffalos, pigs, chickens and ducks), aquaculture (fish) and fishing (0.30%).

In addition, another 29.50% of the total population engage in service delivery (working for government/company/NGO, business, transportation, repairing machinery and electrical devices, construction and factory workers, outmigration for works, etc.), and another 1% involve in handicrafts such as furniture and sculpture.

In agricultural sector, especially rice, the district has a total paddy field area of 81,191ha, including rainfed rice, dry season rice, receding rice and upland rice fields, of which 36,246ha of dry season rice with an average yield of about 4 tons/ha and 12,009 ha of rainfed rice fiels with an average rice yield of 1.60 tons/ha (Source: Socio-Economic Situation of Mongkul Borei District, 2021, Provincial Department of Planning, Banteay Banteay Meanchey province).

About 80% of the total area of dry season rice fields in Mongkol Borey district are located in the east of National Road N.5 in zone 2 and 3 of Tonle Sap Lake's floodplains, some of which are in the CFIs. A small number of the dry season rice fieds in zone 2 have land titles (Prakas 01) while the rest have no deeds.

The dry season rice cultivation there is entirely dependent on pumping water from Mongkol Borey's perennial stream through small-scale irrigation systems. Before 201, some dry season rice fields were

irrigated by two reservoirs built in Preah Netr Preah district, but in 2014 both of them were dissolved by Tonle Sap Authorities due to illegal construction and negative impact on flooded forests.

### 3.2.2 Overview of geography and social-economics of Mongkol Borey district

Based on the geographical and hydrological situation, Mongkol Borey district is located in Mongkol Borey watershed with an average slope of less than 10%, bringing rainwater from the north and west to the southeast towards Tonle Sap Lake. Therefore fisheries resources, especially flooded forests mainly exist in the southeast of Sambuor commune, bordering Preah Nets Preah district of Banteay Meanchey province and Aek Phnom district of Battambang province, where has a lower elevation than other communes in the district.

The district has 7 CFis covering a total area of 19,012 hectares in 4 communes of Sambuor, Koy Maeng, Kouk Ballangk and Ta Lam. In addition, the district consists of 14 CFRs and Steung Kambot FCA (78ha) located in the former fishing lot No.1. Remarkably, flooded forests are seen only in the FCA and in 4 out of the 7 CFis.

In 2020, DFC and DFA set up 15 demarcation poles along boundary of Rohal Steung Kambot’s FiCA under EU funding through CAPFISH-Capture programme and constructed a permanent station in 2019. The flooded forests in the FiCA are strictly protected from any activity of deforestation and flooded forest fires.

Due to the occurrences of flooded forest clearances and fires in recent years in the four CFis, Sambuor commune in Mongkol Borei district is selected as the target commune involved in flooded forest fire management process.

### 3.3 Target districts and communes for flooded forest fire management

Based on the actual geographical and physical conditions as well as working conditions for prevention and extinguishing of flooded forest fires and restoration of flooded forests degraded by wildfires as mentioned above, Banteay Meanchey province has 6 target communes in 2 districts as specified in Table 2 below.

**Table 2: List of target communes and districts for flooded forest fire management in BMC province**

Target districts	Target communes	
1. Monkol Borey	1	Sambuor
	2	Phnum Liep
	3	Rohal
2. Preah Netr Preah	4	Chnuor Mean Chey
	5	Prasat
	6	Preah Netr Preah
2 districts	6 communes	

## 4. Challenges of flooded forest fire management in BMC province

For more than a decade, many cases of flooded forest fires in the foodplains in the province have been occurred every year at small, medium and large scale, but most of them were uncontrollable. According to reports from the communities living in the area, all cases of flooded forest fires are caused by intentional and unintentional human activities. Fires has long been used as a means of clearing newly cut flooded forests to cliam lands for cropping, cleaning farm lands after harvesting, placing fishing graes, hunting wildlifes and collecting honey bee.

The long-standing flooded forest fires have caused seriously negative impacts on fisheries resources, including flooded forests, woody shrubs and grasslands that are the favorite and safe habitats for fish, reptiles and wild birds for seasonally breeding, spawning and feeding. The latest negative impacts are the extinction of some fish species, the decline in fish size and catch, and fisherfolk's daily income, forcing the fishing communities switch from fishing to agriculture, which is led to clearing flooded forests to claim the lands for cultivating rices and other crops according to market demands.

Through the consultation meetings with stakeholders at provincial, district and commune levels, the main issues causing flooded forest fires are identified as follows:

### 4.1 Target districts and communes for flooded forest fire management

Based on the report compiled by the FiA’s working group in charge of flooded forest fire management in Banteay Meanchey provincece after the second meetings in all the target communes confirmed the key causes of the flooded forest fires as follows:

- Burning hangover of dry rice stumps or weeds in rice fields to increase soil fertilizer and clean rice fields makes the fires spread to nearby grasslands or/and flooded forests inadvertently.
- Burning newly cut flooded forest and shrubs for the purpose of farmland expansion.
- Clearing and burning shrubs to open strips for placing the fishing gear “Bor”.
- Uncontrolled cooking fires before leaving by fisherfolks, wildlife hunters, firewood collection, honey bee collectors and animal herders.
- Inadvertently dumping lit cigarette butts into dry grasses and shrubs, bushes and piles of organic matter by smokers resulted in frequently flooded forest fires, especially along the ways in the floodplains.
- Due to negligent use of fires for collecting honey bee in the dry season, the fires spreaded at large scale and burnt dry grasses and flooded forests uncontrollably.
- Climate change, especially prolongation of the drought during the dry season, delays the dryness of vegetation hangover on the topsoil, increasing the likelihood of flooded forest fire occurrences.

The causes of flooded forest fires, as mentioned above, are the intentional, unintentional and negligent actions of people who used fires in the floodplains. Details of these causes are researched in depth for using as a basis information for analyzing, interpreting and defining appropriate approaches to deal with flooded forest fires effectively in specific locations in the target communes.

All causes and problems of flooded forest fires raised by the stakeholders are included in the IFFPMP for Banteay Meanchey to ensure all issues are resolved successfully within the 5 years of the IFFPMP’s implementation

## 4.2 Locations and areas of flooded forest fires

Based on the map showing flooded forest fire sites in Banteay Meanchey province prepared by the FiA and FiAC, it shows 6 flooded forest fire sites with a total area of 245ha in the two target districts as shown in Table 3 below;

**Table 3: List of Locations and areas of burnt flooded forests in Banteay Meanchey province**

No	Location	Commune	Flooded forest fire time	Burnt flooded forest area	Burnt land/forest classification	Causes of flooded forest fires		Natural regeneration status
						Burning	Extiguishment	
<b>Mongkol Borey district</b>								
1	Veal/Bueng Arabong	Sambuor	Apr 2017 (2 days)	15 ha	Wood shrub	Unknown	Self-extinguishment due to isolated location.	Regrow (1-meter height)
			Apr 2020 (2 days)	10 ha	Wood shrub	Unknown	Self-extinguishment due to isolated location.	Regrow (1-meter height)
2	Ang ta Mak	Sambuor	Apr 2016 (4-5 days)	100 ha	Wood shrub	Wildlife hunting	Self-extinguishment	Regrow (1-meter height)
			May 2020 (1 day)	20 ha	Wood shrub	Wildlife hunting	Self-extinguishment	Regrow (1-meter height)
<b>Preah Netr Preah district</b>								
3	Tumnob Tasom	Phnum Liep	Apr 2020 (1 day)	10 ha	Wood shrub	Cleared and burned for dry season rice	Self-extinguishment	Became dry season rice fields
4	Prey Krachab (Muk Kampring)	Phnum Liep	Apr 2016 (3 days)	60 ha	Wood shrub and grass land	- Cooking - Honey bee collection	Self-extinguishment	Regrow (2-meter height)
5	Prey Krachab (Khang Lech Stueng)	Rohal	March 2018					
6	Kbal Achnun (Rohal Kompring)	Rohal	Apr 2019 (3 day3)	30 ha	Wood shrub	Spreaded from Achnun in BTB province	Intervention from the district authority.	Cover by natural wood shrub and grasses
<b>6 locations</b>				<b>245 ha</b>				

## 4.3 Stakeholders and their responsibilities involve in flooded forest fire management

Flooded forests, wood shrubs, aquatic plants, grasslands, floodplains, waterbodies and wetlands are important for the lives of fauna and flora living on the land and in the water, and the Tonle Sap Basin’s



biodiversity is important for livelihoods of Cambodian and provides sources of high protein foods, income generation and as part of supporting the national economy.

Since the potential of fishery resources, especially flooded forests in the floodplains, benefits Cambodian societies and the nation as a whole, many stakeholders were indentified and invited to a series of meetings organized at national and sub-national levels to discuss their roles and responsibilities as described in Table 4 below;

**Table 4: Relevant institutes and responsibilities involve in flooded forest fire management**

Stakeholder	Review	Risk Reduction	Readiness	Response	Recovery
<b>Local communities</b>	Follow up weather forecast related to the prolongation of the dry season and the delay of the rainy season.	Reduce access to inundated forest areas.	Disseminate information on the importance of inundated forests and impacts of flooded forest fires to biodiversity, ecology, wildlife and human life.	Participate in extinguishing flooded forest fires Support forest fire-fighting equipment (power tillers, tractors, pumps, water tanks, hoses ...) as much as possible.	Join planting flooded forest seedlings in flooded forest areas degraded by wildfires and clearance for cropping. Protect and maintain natural and planted tree seedlings in flooded forest restoration sites. Maintain poles and signs placed along borders of flooded forest restoration sites.
<b>Village Security Guards</b>	Study and observe identification and movement of local people in zone 2 and 3.	Participate in extension meetings on importance of flooded forests and effects of flooded forest fires, and help disseminate further the information to the public. Participate in strengthening the implementation of the Fisheries Law.	Participate in and help watch flooded forest fires.	Mobilize local people and join flooded forest firefighting, using locally available tools (tractor, power tillers, pump, water cans, hoes, .) for putting out flooded forest fires as much as possible.	Join planting flooded forest seedlings in flooded forest areas degraded by wildfires and clearance for cropping. Help maintain poles and signs placed along borders of flooded forest restoration sites.
<b>Community Fisheries</b>	Record names of people accessing the inundated forest areas with their purposes during the dry season.	Participate in extension meetings on importance of flooded forests and effects of flooded forest fires, and help disseminate further the information to the CFI members.	Participate in pond/stream rehabilitation streams and conserve water for extinguish flooded forest fires Establish and maintain firebreaks to prevent the spread of flooded forest fires Readily prepare flooded forest firefighting tools for urgent needs.	Mobilize local people and participate in flooded forest firefighting, using locally available tools for putting out flooded forest fires.	Join planting flooded forest seedlings in flooded forest areas degraded by wildfires and clearance for cropping. participate in placing and maintaining poles and signs along borders of flooded forest restoration sites.
<b>Commune councils</b>	Study and identify people accessing the inundated forest areas in their own territory with their purposes.	Disseminate measures to prevent and extinguish flooded forest fires Provide flooded forest fire equipment to the patrol teams. Send people to support the patrol teams as requested. Strengthen fisheries law enforcement based on the policy	Reserve some commune/sangkat funds to pay for extinguishing flooded forest fires, pond/stream rehabilitation, extinguishers, fuel, and so on) Repair and prepare readily flooded forest fire extinguishers for	Mobilize people to join in extinguishing flooded forest fires. Participate in managing flooded forest fires directly. Gather and send firefighting tools to the scene upon requests from the	Cooperate and participate in flooded forest restoration in flooded forest areas were burnt and cleared for farming and burnt. Support budget to place poles and signs bel flood protection forest Disseminate the protection and maintenance of

		reform of decentralization and de-concentration in natural resource management of Commune/Sangkat.	emergency needs.	patrol teams.	flooded forest restoration areas to the people.
<b>Civil Society Organizations /NGOs</b>	Study status of flooded forests and the uses of fishery resources in the floodplains to develop a plan to support the implementation of flooded forest fire management plan of FiA/FiAC and MoE/PDE.	Produce extension materials and conduct awareness raising campaign on importance of flooded forests, effects of flooded forest fires, protected area law and regulations related to flooded forest fire management.	Support budget and human resources to deliver training on flooded forest fire patrol techniques for the patrol teams.	Support budget and logistics for extinguishing flooded forest fires as possible.	Support budget and participated in flooded forest restoration process.
<b>District and commune Police</b>	Prepare lists of owners of tractors, cattles and farm lands, fisherfolks, honey bee collectors, and so on to identify easily the suspects who cause flooded forest fires.	Join patrols with the flooded forest fire patrol teams.  Cooperate with the FiAC to prohibit and control strictly the uses of land and flooded forests in Zone 3.	Prepare firefighters and vehicles to support flooded forest fire fighting immediately.	Support firefighting equipment and participate in extinguishing flooded forest fires	Support and participate in planting flooded forest seedlings.  Participate in enforcing fisheries laws against offenders who clear flooded forest and caused flooded forest fires.
<b>District administration</b>	Collect and store documents/data related to flooded forest management.  Issue declarations or guidances on flooded forest management, including flooded forest fires.	Disseminate information on importance of inundated forest, impacts of flooded forest fires, and law and regulations related to flooded forest fires.	Cooperate with FiAC to provide resource persons as trainers for training of flooded forest firefighting techniques for the patrol teams.	Send forces and equipment to participate in inundated forest fire-fighting as requested by the commune chiefs.	Participate in flooded forest restoration and push local authorities to help protect and maintain the forest restoration sites.
<b>Provincial Department of Agriculture, Forestry and Fisheries (PDAFF)</b>	Reviews reports on flooded forest fires prepared by the FiAC to comment and take measures to prevent and extinguish flooded forest fires effectively.	Supports FiAC to promote local awareness on importance of flooded forests, effects of flooded forest fires, and laws and regulations related to flooded forest management.  Supports Fisheries Law enforcement.	Reports to the provincial administrative unity command on the flooded forest fire issues to get the relevant institutions at provincial level informed and ready to participate in extinguishing flooded forest fires.	Participates in extinguishing flooded forest fires and requests the intervention from district and provincial administrative unity commands.	Participate and cooperate with district, commune and village authorities and NGO partners to support the process of flooded forest reforestation.
<b>Provincial administration and relevant entities.</b>	Identify relevant entities at provincial level and formulate policies supporting flooded forest fire management.	Disseminate the measures to prevent and manage flooded forest fires to the relevant entities.  Take legal action against persons and units which have cleared and burned flooded forests.	Provide high risk level warnings when necessary  Readily prepare forces and means to support flooded forest fire extinguishment.  Provide flooded forest fire extinguishers to the patrol teams and CFIs.	Send forces and means to participate in extinguishing flooded forest fires urgently.	Join tree planting events.  Support budget for the inundated forest restoration..
<b>Tonle Sap Authority</b>	Study situation of flooded forests and the uses of fishery resources in the floodplains in order to develop strategies for	Produce extension materials and conduct awareness raising campaigns on importance of flooded forests,	Provide flooded forest fire extinguishers to the patrol teams and CFIs.	Participate in extinguishing flooded forest fires by other means.	Participate and support the process of flooded forest restoration  Encourage relevant entities at sub-national level to help protect

	managing flooded forest Inspect the poles placed along zone 3 border and set up additional poles where spaces between 2 poles are far apart.	effects of flooded forest fires on people, animals, biodiversity and ecosystem of Tonle Sap basin.			and maintain the forest rehabilitation sites.
<b>Fisheries Administration &amp; Fisheries Administration Cantonments</b>	Collect and store documents related to flooded forest fire management recorded causes, extent of damage, methods of extinguishment and flooded forest fire maps. Regularly monitor flooded forest fires to update situation of flooded forests. Research and document fishery resources, ecology and livelihoods in the floodplains, especially in Zone 3.	Produce extension materials and conduct awareness raising on importance of flooded forests, effects of flooded forest fires, and laws and regulations related to flooded forest fires. Strengthen Fisheries Law enforcement.	Coordinate and support the patrol teams to monitor flooded forest fires. Coordinate and raise funds to support flooded forest fire prevention and management. Provide and monitor the uses and maintenance of firefighting equipment for urgently putting out flooded forest fires.	Lead and coordinate in extinguishing of flooded forest fires. Report to and request from relevant entities for immediate intervention to flooded forest fire extinguishment. Investigate, follow up, explore and document illegal cases causing flooded forest fires in accordance with the procedure stated in the Fisheries Law.	Organize tree planting ceremonies. Protect and maintain natural and planted flooded tree seedlings in flooded forest restoration sites. Assess survival and growth rate of flooded tree seedlings in flooded forest reforestation sites.
<b>Ministry of Environment</b>	Conduct ecological and livelihood surveys in inundated forest areas to develop flood forest fire management plan for the Tonle Sap Lake Biosphere Reserve in conjunction with the IFFPMP of FiA.	Produce extension materials and conduct awareness raising campaign on importance of flooded forests, effects of flooded forest fires, protected area law and regulations related to flooded forest fire management.	Provide training on flooded forest fire patrol techniques to rangers and community protected area. Supply and monitor the uses and maintenance of flooded forest fire extinguishers.	Assign rangers to help fight flooded forest fires occurring in and outside protected areas. Inform Provincial Department of Environment to monitor and participate in extinguishing flooded forest fires as requested by the provincial administration.	Participate in planting flooded forest seedlings and maintain flooded forest restoration sites within protected area.

The stakeholder identification is indispensable for the planning that takes into account the various target groups and their involvement at different stages (flooded forest fire prevention and control and flooded forest reforestation) of flooded forest fire management as mentioned in the five-year IFFPMP.

Relevant stakeholders of flooded fire management include local authorities, competent agencies, civil society, NGOs, CFis, forest fire patrol teams, fisherflocks, farmers, and user groups of fisheries resources.

#### 4.4 Challenges for taking measures to respond flooded forest fires

According to the history of flooded forest fire management in Banteay Meanchey province, it is revealed that until now, no any flooded forest fire management structure at provincial, district or commune level has been established to address the fire problems, causing by a number of the factors as shown below:

- **Lack of flooded forest fire management mechanism:** Many cases of flooded forest fires have been occurred every year, especially in 2019s and 2020s, while flooded forests in zone 2 and zone 3 were heavily cleared for rice cultivation. CFis and local people informed the concerned FiA triage, relevant competent agencies and local authorities of the forest fire cases for helping control but only a few cases of interventions offered. This may be caused by the absence of flooded forest fire management mechanism at all levels to prepare manpower, tools and budgets for preventing and extinguishing flooded forest fires in a timely manner.
- **No flooded forest fire management plan:** Due to the absence of a mechanism or coalition group consisting of members from relevant stakeholders established for flooded forest fire

management at the provincial level, a systematic IFFPMP has not been developed and let flooded forest fires freely happened without controllable. In the past, despite some efforts made by CFIs to put out flooded forest fires in their territories but they got less results due to lack of the readiness and equipment.

- **Limited local knowledge of flooded forest fire-related laws and the effects:** Most local people are aware of the laws related to illegal fishing as many extension meetings on this topic were organized locally and such information are shared publicly through social media such as posters, banners, radio, television, Telegram, Facebook, etc. Thus, local communities seem to have little understanding of the laws/declarations associated with flooded forest fires because the extension campaigns and materials related to participatory flooded forest fire prevention and management were delivered and distributed inadequately.

Due to the limited understanding of flood forest fire prevention and management, when local people experience flooded forest fires being occurred and are willing to put them out, but do not know clearly the reporting mechanism to report to request helps/intervention to extinguish the fires in time.

- **Difficult access to flooded forest fire areas:** Due to the geographically complex situation of the floodplains covering by dense shrubs and having no accessible road for motorized vehicles (motorcycle, power tiller and locally processed transportation vehicle), the effort for transporting water and fire extinguishers to fight the on-going flooded forest fires at the scene is hampered. The inaccessibility allows flooded forest fires to spread freely and uncontrollably until they go out on their own.
- **Lack of water:** Due to climate change in the 2019s and early 2020s in connection to the prolongation of the dry season and deposition of sediments into natural waterbodies resulted from deforestation and improper land preparation for agricultural practices in the upstream areas and, pumping ponds for fishing and irrigating dry season rice, most of natural streams and ponds dry up during dry season. This phenomena is the major constraint that restricts theextinguishing operation of flooded forest fires. Water is a major factor in extinguishing flooded forest fires, and the lack of water sources in flooded forest areas is a major concern hindering the extinguishing of wildfires.
- **Lack of budget and equipment:** Extinguishment of flooded forest fires is a very difficult task that requires all involved stakeholders at sub-national level to participate under an effective management mechanism with enough budget and equipment. The sub-national stakeholders include competent departments/entities, three-type armed forces, local authorities, government and non-government organizations, CFIs and local communities. The leading organizations for flooded forest fire control are PDAFF/FiAC, relevant departments and provincial, district and commune authorities. They, however, have not yet been able to fulfill this roles fully due to the lack of funds and equipment.

Due to the obstacles mentioned above, when a flooded forest fire occurred the relevant departments only had ideas on how to prevent and reduce cases of flooded forest fires, but no any unified option was implemented effectively.

#### **4.5 Law enforcement to prevent flooded forest fires**

Flooded forest fires occur every year in the province that are most likely caused by the local people living in the concerned villages and communes and outsiders. Some fisherfolks and farmers from neighboring communes have entered into the floodplains in dry season for fishing, fuelwood collection, hunting wildlife, and cleaning farmlands. Therefore some cases of flooded forest fires can be caused by these groups through their careless activities of cooking, burning wastes in farmlands, cutting and burning shrubs for placing fishing gears, lighting dry water hyacinth for catching reptile, setting fire to honey bee collection, and discarding lit cigarette butts into dry bushes or/and grasses.

Flooded forest land claims and deals of agricultural lands in zone 2 and 3 in the province are common. Some land brokers or rich people hired local people by providing some money and machineries to clear and convert flooded forests into rice fields as much as they can for selling purpose. Some concrete poles put up along zone 3's border were damaged by unknown people in order to deceive the eyes of competent agencies in reason of flooded forest land encroachment and rice field expansion in zone 3.

So far, the FiA Cantonment has investigated, prepared offense letters, arrested and sent some suspects who involved in causing flooded forest fires and clearing flooded forest lands to the provincial court for further legal action.

## **5. Implementation process of the IFFPMP**

To ensure the effective and timely implementation of participatory IFFPMP in accordance with the 5 "R" principles and the 3 key stages: 1.Prevention (review, risk reduction and readiness) 2.Response to flooded forest fires, and 3.Flooded forest reforestation as stated in the guidelines on the development of flooded forest fire management plan, the IFFPMP for Banteay Meanchey province should be implemented as the following procedure.

### **5.1 Prevention of flooded forest fires**

As mentioned above, the flooded forest fire prevention step is divided into three sub-steps: 1. Review of knowledge and experience on flooded forest fire management, 2. Reduction of the probability of flooded forest fires, and 3. Readiness for prevention and extinguishing on flooded forest fires.

#### **5.1.1 Review**

Review of experiences, information, data and understanding of causes of flooded forest fires made by human or natural phenomena, wildfire behaviors, meteorological forecasts, climate, humidity situation and dry biomass and vegetation susceptible to fires in the given area and the effects of flooded forest fires in different sites over the years in the province are important to the preparation of strategic plan for prevention and management of flooded forest fires in accordance with the real situation and condition in each target commune. This review should be carried out following activities below:

##### **A. Consultation meetings on flooded forest fire issues**

Consultation meetings with FiAC, relevant sub-national government departments, local authorities, NGOs, civil society, CFIs and local community representatives were held subsequently to gather the most updated information and data on causes and behavior of flooded forest fires, elements causing the fires (drought, heat, humidity, air, biomass residues and organic matter), groups of people suspected of causing the fires, effects of flooded forest fires, how to prevent and extinguish the fires, flooded forest restoration approaches that have been implemented so far and stakeholders involved in flooded forest fire management process.

The information gathered at this stage will be used to determine effective methods for flooded forest fire management, in particular for flooded forest fire prevention.

##### **B. Field observation at flooded forest fire sites**

Direct observation of flooded forest fire sites is conducted after the consultation meetings to gather additional information on geo-physical situation, temporary accommodation locations in or near the flooded forest fire sites, signs of flooded forest fire causes, land use patterns, land and forest cover, flooded forest species, and scope of the damage. Coordinates of the burnt locations must be collected during the observation for producing maps of flooded forest fire sites.

#### **5.1.2 Risk reduction**

The action to reduce the risk of flooded forest fires is aimed at reducing the number of the forest fire cases maximally from the beginning of the dry season, which is the most important part of flooded forest fire prevention with low cost to reduce the damages by the wildfires, focusing on the potential causes of flooded forest fires and preventing those causes from occurring.

##### **A. Extension material design and printing out**

In order to obtain simple, easy-to-understand and meaningful extension materials for raising local awareness, the working group in charge of flooded forest management must consider the following options:

- In case there is a soft copy of existing media material on the topic of flooded forest fire prevention and management and Fisheries Law enforcement against offenders who caused flooded forest fires, the working group should use it to produce extension materials as needed as it saves times and budget.



- In case the existing data has no enough meaning, the team should consider designing images and messages for developing the new extension material with the support from the FAO's communication officer to obtain simple, easy to read and understand and meaningful one to raise the awareness of relevant stakeholders.

## **B. Meetings at commune level on plan for conduction local awareness raising**

Meeting with representatives of WGFFFM at the district and commune levels, FFFPTs and CFIs to:

- Locate sites for placing billboards;
- Identify target groups, villages and locations for the extension campaign of participatory flooded forest fire management. The number of men and women of each target group to be invited to participate in the campaign should be equally. Use the list of those involved in using lands and fisheries resources in zone 2 and 3 to facilitate this identification.
- Introduce how to read and use the extension materials to raise local awareness to participate in preventing flooded forest fires and clearing flooded forests.
- Develop action plan for conducting extension campaign with the WGFFFM at district and commune levels, specifying their roles and responsibilities, necessary materials to be used (copies of relevant laws and legal papers, VDO spots, banner, posters, loud speakers), invitations of participants, times and venues of the extension meetings.
- Provide posters to district, commune, village administrations and CFIs to help post at the given sites before the extension meeting arrivals.

## **C. Local awareness raising campaign on participatory flooded forest fire management**

- Install signboards, billboards at designated locations.
- Distribute educational materials such as leaflets or posters to local people
- Organize awareness raising meetings for the target groups in villages and at temporary staying locations on participatory prevention and management of flooded forest fires and strict law enforcement against those who cut and burn flooded forests.
- Gather feedbacks on issues related to prevention and extinguishment of flooded forest fires raised in the extension meeting for jointly taking further action.

## **D. Regular flooded forest fire patrol**

The FFFPTs do patrol based on weekly and monthly patrol plans prepared and agreed by the team members

and the working group at commune level. Each member must bring a portable forest fire extinguishers with them to putting out flooded forest fires as possible encountered during the patrol. In addition, in the patrol period, the FFFPTs must record activities and events of flooded forest fires and thought to cause flooded forest fires, and coordinates of the events in the distribute spread sheet format. Pictures of flooded forest fires and venues, firefighting activities, suspects of causing flooded forest fires have to be shot as evidences. The patrol team must inform chiefs of the commune and the FiA Triage on a regular basis about patrol situation, cutting flooded forests and flooded forest fire events in order to request timely intervention.

The commune and FiA triage chiefs have to get ready to follow up and communicate the FFFPTs regularly via telephone or communication radio so that they can take action in response to requests for assistance from the patrol teams in a timely manner. The commune chief must also request the immediate interventions from the WGFFFM at district or provincial levels in case that flooded forest fires are at large scale cannot be controlled by the patrol teams.

### **5.1.3 Readiness**

The readiness is the preparation of management structure of working groups at provincial, district and commune levels, infrastructure construction and supplies of necessary tools and equipment for immediate responses to flooded forest fires happened eventually. The readiness also aims to identify stakeholders and required infrastructures and equipment to get ready for timely interventions appropriate to the extents of flooded forest fires to reduce high cost of the extinguishment due to the unpreparedness.

## **A. Formation of working groups for flooded forest fire management (WGFFFM) at provincial, district and commune levels**

- Draft Decision Letter on establishment of Working Group for Flooded Forest Fire Management (WGFFFM) at provincial district and commune levels, including roles and responsibilities of the working group, and send this draft to the concerned provincial and district governors and commune chiefs for review and correction by their own administrative affairs.
- Collaborate with the target provincial and district administrations to organize meetings with relevant units at provincial and district levels to establish WGFFFM formally at provincial and district levels.
- Meet commune councilors and relevant stakeholders to establish Flooded Forest Fire Patrol Teams (FFFPTs) at commune-level.

### **B. Annual WGFFFM meeting at provincial level**

Pursuant to the roles and duties of the WGFFFM at provincial level as stated in the Decision Letter signed by the H.E. Governor of Banteay Meanchey province, the FiAC, in cooperation with the provincial administration, organizes a yearly WGFFFM meeting at the provincial level to be chaired by chief of the WGFFFM (H.E. provincial governor or deputy governor) at the beginning of each year to help push and

strengthen the IFFPMP's implementation at the local level effectively and timely with good cooperation from all relevant stakeholders. Participants of the meeting are all members of the WGFFFM at provincial, district and commune levels.

The agenda and objectives of the meeting is to present the annual IFFPMP at provincial level, recall roles and responsibilities of the WGFFFM and raise key issues related to communication, law enforcement, means of flooded forest fires extinguishment and budget, to be addressed immediately before the provincial governor to review and advise to ensure the IFFPMP will be implemented smoothly and effectively.

Prior to the meeting, the FiAC's officials should submit a formal request for organizing the meeting, attached with the meeting agenda, the Decision Letter of the provincial-level WGFFFM establishment, the annual IFFPMP, report of quarterly WGFFFM meeting(s) at district level, map of flooded forest fires, map of flooded forest restoration and relevant document to the working group chief for information, taking action and distributing to the relevant districts and communes to be ready to participate.

After the meeting, the FiAC shall prepare and send the meeting report to the PDAFF's director and the WGFFFM's chief for review and signing. This report will be sent further to FiA and all relevant institutions at provincial, district and commune levels for information and taking action.

### **C. Quarterly WGFFFM meeting at district level**

The FiAC, in cooperation with the district authority, organizes WGFFFM meeting at district level on quarterly basis or as necessary to provide an opportunity for the FFFPT, the WGFFFM and the FiAC to meet and review the results of flooded forest fire management in the last three months and lay the outstanding problems on the table to be solved by the working group, especially the District Unity Command (DUC), to give suggestions and recommendations, and take action to solve those problems in time. It would be good if representatives of the FiA and the WGFFFM at provincial level attend the meeting to make the solutions more effective and cooperative.

After this meeting, the FiAC shall prepare and send the meeting report to the district governor/deputy governor, chief of the meeting, for review and signing. This report will then be sent to all relevant departments and offices at the provincial, district and commune levels for information and action.

### **D. Monthly FFFPT meeting at commune level**

Monthly FFFPT meeting at commune level to be chaired by the concerned commune and FiA Triage chiefs should be held on monthly basis to share experiences on flooded forest fire prevention and extinguishment among the patrol teams, raise challenges encountered during patrols and seek solutions from the chairpersons for solving all the challenges to encourage the patrol teams to carry out further their duties.

After attending the training on flooded forest fire patrol techniques, the patrol team understood well the roles and responsibilities of the team, preparation of patrol plan, recording patrol events, flooded forest fire-fighting methods, extinguisher management, and relevant laws and regulations (Fisheries Law, Land Law, Sub-Decree No.197, etc.), so the monthly meeting is also aimed to review and remind the existing knowledge and provide new information and news that has just been received.

At the same time, the monthly patrol team meeting also aims to review its management structure to strengthen the roles and responsibilities of the team, which may be disrupted by some members are

inactive, sick, busy with his/her own businesses or resigned from the group. The meetings are also held to inspect the condition of forest firefighting equipment to determine whether which equipment are damaged to be repaired and lost to be purchased the new ones to ensure the patrol team has enough extinguishers for putting out flooded forest fires.

Women members are encouraged to speak out the challenges of the women faced in the patrols for addressing and to encourage more women to participate in this action, especially to increase woman roles in managing flooded forests in their respective villages and communes.

Minutes of meeting must be developed at once at the end of the meeting to report to the commune chief, the WGFFFM at district level and the FiAC's chief for information and taking action to respond to the facing challenges timely.

### **E. Building physical structures for flooded forest fire prevention and response**

As mentioned above, the necessary physical structures to be constructed for prevention and extinguishment of flooded forest fires include placement of additional concrete poles along zone 3 border, planting poles along borders of the flooded forest fire sites, construction of flooded forest fire watching towers, and rehabilitation of ponds or streams. Due to limited budget, not all the structures needed are constructed only in the first year, but from year to year according to the priority needs set in consultation meetings at commune level and available budget. According to the procurement principles and techniques, the construction of the physical infrastructure will be carried out following the below process:

- Organize 1<sup>st</sup> consultation meeting with commune and village leaders, CFis and FFFPTs to determine the locations for construction of flooded forest fire watching towers, ponds to be rehabilitated and burnt flooded forest sites to be marked with poles and signs.
- Study technical specifications and estimated costs of every infrastructure for bidding.
- Prepare bidding documents and manage bidding process (public announcement, screening qualified engineering companies for the bidding, conduct and monitor the bidding, selected awarded engineering companies) for physical restructuring to support the flooded forest fire management.
- Sign the construction contract, inspect the construction and disbursement.

This procurement task is generally carried out by the Procurement Team of the Fisheries Administration in collaboration with the EU Procurement officers who support CAPFISH-Capture.

### **F. Improvement of knowledge and skill of the FFFPTs**

- Prepare training manuals on flooded forest fire patrol techniques focusing on roles and responsibilities of the FFFPTs, importance of flooded forests, impacts of flooded forest fires on ecosystem of the Lake's floodplains and socio-economic, strategic flooded forest fire patrol, using smart devices to monitor and report, uses and maintenance of flooded forest fire extinguishers, how to disseminate information through social media via smart phones, Fisheries Laws and legal papers associated with flooded forest fires activity planning and report writing to be prepared by the Fisheries Administration in collaboration with NGO partner organizations
- Organize training on flooded forest fire patrol techniques for the FFFPTs at commune level to provide opportunities to all the patrol team members to share and learn experiences from each other through practical exercises by using modern techniques and tools.
- Conduct weekly and monthly meetings regularly to allow all members of the patrol teams participate in discussion on the patrol plan in a voluntary and ownership manner for implementing after the meeting. The patrol plan will be then reviewed and signed by the relevant commune chief.
- The FIA Triage and commune chiefs have to monitor and improve the practices of the knowledge gained from the training to ensure the quality and effectiveness of flooded forest fire patrol.

### **G. Equipping the FFFPTs with flooded forest fire-fighting tools**

Equipment to be used by the FFFPTs commonly and individually for personal safety, including portable dry powder extinguisher cylinders, pump backpack sprayers, smartphones, drones, walkie-talkie, first aid kits, masks, goggles, gloves, helmets, fire-fighting shoes, hammocks, machetes, torches, motorbikes equipped

with water pumps, hoses and water guns, and so on, will be purchased and distributed to the patrol teams for uses as needed.

Regulation on the use of fire extinguishers to be used by patrol team must be developed and disseminated to all of the team members through commune-level meeting to ensure the equipment are used in accordance with the guidance stated in the regulation and maintained well and long lasting.

Additional training at the commune level on the proper uses and maintenance of forest fire equipment will be provided to all the patrol teams to ensure that the extinguishers are used effectively, safely, long-lasting and under technical standard.

## **5.2 Response to flooded forest fires**

The interventional phase focuses on flooded forest fire extinguishment, Fisheries Laws enforcement and regular patrol of flooded forest fires by the patrol teams under direct support of the FiA Triage and commune chiefs.

In case the patrol teams encounters flooded forest fires occurring during the patrol, each member must take measures to extinguish the wildfires according to the following instructions:

### **A. Small-scale flooded forest fire cases**

When the patrol teams meet flooded forest fires at small scale, controllable case, the team members have to use the mobile forest fire extinguishers they brought with or items locally available there as instructed below:

- Cover mouth and nose with a mask, soaked scarf or T-shirt to reduce the absorption of smoke, ashes and dust.
- Use twigs to put out the fires.
- Use shovels or hoes to dig the soil to cover/extinguish the fires or create firebreaks for preventing the spread of fires.
- Use water in the portable tanks to put out the fires.
- Make sure the fires are completely extinguished before leaving the scene to avoid the fire re-occurrence.
- Take photos and report the incident to chiefs of the commune and FiA Triage via mobile phone, communication radio or smart phone application.

### **B. Meso/big-scale flooded forest fire cases**

If the flooded forest fire is at large scale, the patrol teams and local firefighters must be vigilant to protect their own safety by taking flooded forest fire measures following the below instruction:

- Cover mouth and nose with a mask, soaked scarf or T-shirt to reduce the absorption of smoke, ashes and dust.
- Inform chief of the village, commune and FIA Triage via phone or communication radio about the incident in order to get helps (forces and equipment) for flooded forest firefighting from the commune, district and provincial authorities.
- Use portable fire extinguishers as much as possible to prevent the spread of flooded forest fires, keeping a safe distance from the fire to avoid eventual hazards.
- Mobilize people nearby the scene to help put out flooded forest fires by using available tools such as water pumps, power tillers, tractors, water tanks, water cans, pipes, etc.
- The commune chief must immediately notify the district governor for requesting assistance of fire-fighting trucks and fire-fighters to come to the scene to help control the flooded forest fires.
- Commune chiefs and village chiefs must mobilize people living in the villages closest to the flooded forest fire sites by bringing available equipment such as power tillers, tractors, water pumps, hoses, water tanks and cans to help extinguish the wildfires urgently.
- If fire trucks are unable to reach flooded forest fire sties, they will be used as the water supply to fill water tanks loaded on power tillers or locally processed trucks to transport the scenes for putting out the wildfires.

- In extinguishing flooded forest fires, power tillers and tractors can be used to clear strips as firebreaks where possible (grasslands, wood shrubs or bushes) to prevent the wildfire spread.
- Make sure flooded forest fires are completely extinguished to avoid the fire recurrence before leaving the scene.
- Prepare a report on the flooded forest fires, describing location, burnt flooded forest areas, causes of fires, stakeholders and number of people involved in extinguishment, types of extinguishers used, scope of damage and recommendations for considering better measures of flooded forest fire fighting to be applied in the future.

### 5.3 Restoration of fire-damaged flooded forests

Flooded forests in Tonle Sap's floodplains are divided into three classifications: flooded forests, flooded wood shrubs<sup>1</sup>, and grass. Flooded forests are higher than 4 meters, some are up to 15 meters high, mostly grow on the bank of Tonle Sap Lake and wetlands and along streams. Flooded wood shrubs are lower than 4 meters high and consist of flooded trees scattering throughout the shrubs with an average stand density of about 25-30 trees/ha.

During the rainy season, flooded forests and wood shrubs are completely submerged, unable to grow because there is not enough sunlight for photosynthesis. At this stage, all the leaves fall, rot and become fish feeds and make the environment of the flooded forest areas more biological.

Every year, flooded forests and shrubs release large amounts of green and organic matters (barks, roots, branches and fruits) that are decomposed under natural influence into minerals such as calcium, potassium, phosphate, sulfate, etc. and disintegrated by microorganisms into salts and minerals for plant growth and soil quality maintenance with black soil. Additionally, flooded forests and shrubs help maintain water quality by providing oxygen to water and absorbing toxins such as nitrate, nitrous dioxide and calcium nitrate.

In the floodplain area, there is a lot of organic debris that originates from its flooded forest and shrubs and from the upper reaches, which decomposes and develop plankton and Zoobentos to feed on fish.

In Banteay Meanchey province, the flooded forest susceptible to fires is dense wood shrub with canopy of about 70% - 90% and height up to 4 meters. The wood shrub species include *Croton caudatus*, *Acacia spiralis*, *Uncaria homomalla*, *Ixora cuneifolia*, *Cratoxylon prunifera*, *Crataeva religiosa*, *Zizyphus sp.*, *Hymenocardia wallichii*, *Vitex holpadenon*, *Morinda Persicaefolia*, *Antidesma ghasembilla*, *Breynia rhamnoides*, *Breynia rhamnoides*, etc.). Flooded forest trees (*Barringtonia acutangula*, *Mitragyna bruninisa*, *Combretum trifloratum*, *Xanthophyllum glancam* and *Terminalia Cambodiana*) stand scattered about 20-25 meters apart in the shrubs. The ground layers of the shrub forest consist of many herbs and vines and *Mimosa pigra* are seen growing in places where shrub canopy is less than 50%. Generally, the shrubs, underground plants and *Mimosa pigra* dry and fall off their leaves in the dry season, so such a flooded forest is more prone to wildfires in the dry season, starting from March.

In the flooded forest areas located far from streams where were burned two or three years ago, many natural regenerations are seen but most of them are shrub species and *Giant Mimosa at 2-3 meter height*. Very few tree seedlings of *Barringtonia acutangula* are growing under the shrubs and the thorny bushes which have very low growth rate due to the stresses of the micro-climate (competition of sunlight, spaces, water, and nutrients).

The flooded forest areas next to the streams where were burnt for many years, especially in Kandieng district, are now covered by dense grasses and reeds of about 2-meter height, so flooded forest and shrub seedlings cannot be survived. This may be the result of repeated wildfires in that locations. According to the limited budget for the restoration, the geographical situation and biodiversity in the burnt flooded forest location, the reforestation approaches there should be considered two options: protection and maintenance of natural regeneration and planting flooded forest seedlings in the areas where have no or very few seed trees.

#### 5.3.1 Rapid assessment on flooded forest restoration approaches

##### A. Field assessment to define flooded forest restoration approaches

<sup>1</sup> Cambodia forest cover 2014, UN-REDD, Sept 2016



Rapid assessment of flooded forest fire sites is carried out to gather information/data on the extent of damage, geographical, physical, biodiversity and ecological aspects of fire-affected flooded forest areas, tree species to be selected for planting, low-cost restoration and maintenance methods, produce flooded forest restoration map, prepare low-cost flooded forest restore plan and estimated budget. This assessment will be conducted annually at the beginning of the dry season to provide sufficient time for preparation and implementation of the restoration plan.

#### **B. 1<sup>st</sup> Commune-level meeting on flooded forest restoration plan**

This is the first commune meeting with relevant stakeholders, including the FiA Triage, local authorities, the FFFPTs, CFis and NGO partners, to discuss action plan for flooded forest restoration, emphasizing restoration site selection, restoration with enrichment planting and protection and maintenance of natural seedlings, tree species selection, nursery establishment, seedling production by seeds or/and natural seedlings collection, site preparation, seedling transportation, mobilization of local people to participate in tree planting, support to and monitoring of tree planting, organizing tree planting ceremony, maintenance of natural and planted seedlings, assessment of seedling survival and growth rates, formation of local working groups to support the flooded forest restoration, budget needed, and writing report on results of the restoration.

#### **C. Demarcation and mapping degraded flooded forests to be restored**

The FiAC's officials working with the FFFPTs and CFis, locate burnt flooded forest sites to be restored with different methods, collect GPS coordinates of all the sites for mapping of flooded forest restoration, and post concrete poles and poles and signs along the boundaries of the sites to prevent them from the attempts to use land in the sites for growing rice or other crops. The map to be produced shall include the point at which concrete poles with the signs will be put up.

At the same time, village chiefs and commune chiefs should inform the people through village and commune meetings about the locations and protection of all the flooded forest restoration sites in their administrative areas and take legal action against those who did cropping or let animals into the restoration sites.

#### **D. Protection of flooded forest restoration area**

Prohibition and protection of flooded reforestation sites from releasing cattle to grazing is essential as animals will trample on flooded forest seedlings, so be sure to put up signs to inform cattle herders about the ban about prohibition of animal entry into the flooded forest restoration sites. All relevant commune and village chiefs must help disseminate this information to the local people in order to increase their participation in the reforestation in order to achieve satisfactory results.

#### **E. Patrolling flooded forest restoration sites**

It is very important that the patrol team include the inspection of the flooded forest reforestation sites in their weekly and monthly plans to ensure that all the restoration sites are safe and avoid any disruptive activities such as grazing domestic animals, cropping and wildfires that affect the seedling survival and growth.

Meanwhile, when inspecting the flooded forest restoration sites, the FFFPTs must report to the concerned chief of FiA Triages respectively about negative impacts on seedlings caused by suppression of thick grasses or water hyacinth, pests and weeds invasion making some seedlings stressed and died due to lack of sunlight, water, spaces and nutrients in order to take measures to save seedlings with silviculture operation for the sake of improvement of seedling survival and growth rate.

### **5.3.2 Flooded forest restoration by Assisted Natural Regeneration (ANR)**

If flooded forest fire sites are near flooded forests rich in seed trees, the flooded forest restoration by enrichment planting is not necessary as the seed trees will drop and scatter seeds throughout the burnt forest areas in December, and natural seedlings will grow in late December or in January if the soil is still moist. But, if the soil is dry, the seeds will delay sprouting until the beginning of the next rainy season after three or four heavy rains. Although there are many natural seedlings, the restoration sites must be still maintained following the below guidance.

Natural regeneration of flooded forest (*Barrintonia acutangula*, *Diospyros cambodiana*, *Mitragyna bruninisa*, etc.) died under the pressures of dense shrubs and grasses, oppression of water hyacinth, trampling by domestic cattle and flooded forest fires. Therefore, maintenance and liberation of seedlings in the forest restoration sites by clearing grasses within one meter around seedling base, suppression or

cutting grasses in the restoration sites, removal of water hyacinth pressing down on seedlings, and protection of the restoration sites from domestic cattle entry in the first three to four years are a must. These activities not only save the lives of tree seedlings from micro-climate pressure, but also enhance their growth.

This maintenance method is called "Assisted Natural Regeneration (ANR)" that must be applied for at least the first 3 years to keep the seedlings strong enough to overcome the competition for sunlight, nutrients, spaces and water against weeds, grasses and vegetation growing around them.

### **5.3.3 Flooded forest restoration by enrichment planting**

#### **A. Workshop on tree nursery management and flooded forest fire restoration approaches**

The FiA's officers, in collaboration with technical staff of relevant institutions, prepare documents related to tree nursery management and flooded forest restoration approaches, which focuses on:

- **Tree nursery management:** site selection, establishment of tree nursery team (at least 40% of the total number of team members are women), designing and construction of tree nurseries, required materials, soil selection, soil mixing and placing in polybags, seed collection and propagation, natural seedling collection, care of seedlings, seedling transportation and bookkeeping.
- **Flood forest restoration approaches:** starts from site selection, rapid assessment of geography, physics, ecology and ecology of flooded forest restoration sites to determine appropriate restoration approaches for each of them and mapping. The restoration approaches include tree planting methods (cluster planting, alternative planting, mixed plating and stripped planting), selection of tree species to be planted, pit size, seedling/pit spacing, transplanting seedlings, care of seedlings, forming local teams to support flooded forest restoration (seedling planting, protection and maintenance), implementing times by stages, and papers for recording flooded forest restoration activities.

#### **B. Support to tree nursery establishment**

Flooded tree seedlings for forest restoration should be produced by CFIs that live near the forest restoration site as it is part of local capacity development in tree nursery management and sustainability of flooded forest restoration. Therefore, the FiAC's officials who attended the workshop on "Tree Nursery Management and Flooded Forest Restoration Approaches" have to support the CFIs to establish tree nursery for producing flooded tree seedling following below instructions:

- **Site selection for tree nursery establishment:** The most suitable location for setting up a nursery is the site where: having permanent water, non-flooded area in rainy season, near residential land easy to access the nursery for maintenance, having road for transporting nursery materials and near the restoration site to reduce seedling transportation costs. Nursery size is varied depending on the number of seedlings to be produced.
- **Formation of seedling production group:** At least 10 people, including at least 5 women, are selected and organized as a seedling production group. The group management structure includes roles and responsibilities of the team members and benefit sharing is developed through consultation meetings among the team members to ensure the seedling production runs smoothly, successfully and transparently.
- **Strengthen capacity of seedling production group:** The FiAC will provide training through on-the-job-training on tree nursery management with practical activities of nursery installation, soil mixing, placing mixed soil in polybags, seed collection, seed propagation, seedling maintenance to the group members to ensure they can run on their own. At the same time, the FiAC has to provide knowledge to the group on seedling nursery production planning, bookkeeping to monitor and record times and activities carried out by each team member, materials used for the seedling production, number of seedlings by species and costs.

As locally available materials for seedling production are limited, the FiAC should provide some materials such as nets, pillars, plastic bags, watering cans, wire and fertilizer as mentioned in the training to support the tree nursery installation and flooded forest seedling production.

- **Technical support to seedling production group:** Every FiA Triage involved in flooded forest restoration has to assign an officer to assist the seedling production teams established within the FiA Triage on a regular basis to prepare tree nursery and maintain flooded forest seedlings by actual stages.

### **C. 2<sup>nd</sup> Commune-level meeting on action plan for flooded forest restoration**

A 2<sup>nd</sup> consultation meeting at commune level to review and finalize the flooded forest restoration plan drafted in the 1st meeting is necessary for implementing next month. More importantly, it examines the local working arrangements that have been promised to be done after the first meeting and confirms the mobilization of local communities to participate in upcoming tree planting events. The participants of the meeting include FiAC's officers, local authorities, CFIs and FFFPTs.

### **D. Organizing tree planting ceremony**

Flooded tree planting ceremony should be held in each target district to promote joint efforts from every milieu for flooded forest protection, flooded forest fire management and flooded forest restoration. The ceremony has to be held under chairmanship of the district governor, and if possible, the presence of the provincial governor and/or the FiA's Director General as chair of the event will mark it historically important and be considered as a nationwide outreach campaign for fisheries resource management and flooded forest restoration in Cambodia.

Information, messages and pictures of the flooded tree planting ceremony are widely shared through public media as part of education to raise public awareness on fisheries resource management, in particular the flooded forest management in the Tonle Sap Lake region.

The FiAC will play an important role in facilitating the discussions with the WGFFFM at district and commune levels on organization of tree planting ceremony, including inviting honorable guests, venue preparation, seedling transportation, master of ceremony, tree planting materials, snacks, sharing information through public media and logistics.

### **E. Supporting and monitoring tree planting**

To ensure the tree planting is carried out well, after attending the workshop on "Tree Nursery Management of Flooded Forest Fire Restoration Approaches", the FiAC's officers in charge of flooded forest restoration should follow the below activities:

- Briefly review the tree planting techniques before planting seedlings, specifying safe seedling transportation, pit size, pit spacing, pitting, tearing polybags, transplanting seedlings, filling up pits and tamping down the soil after planting, strengthening seedlings with wooden sticks, and watering if the soil is too dry.
- Mark spots to be pitted with wooden/bamboo sticks to avoid planting seedlings too close together and under tree shade or in the bush.
- During transportation of seedlings from the nursery to the restoration sites, the nursery team leader must record numbers of seedlings taken out and damaged by the transportation by species, specifying the damaging reasons.
- Divide a flooded forest restoration site into sub-blocks for tree planting by different groups to be easy for monitoring by the local working teams. This will help the teams to determine numbers of seedlings planted, seedlings planted technically incorrect, seedlings damaged during planting and identification of the responsible planting groups for replanting.
- Support and monitor tree planting by local people to ensure dug pit size, transplanting seedlings, seedling species, filling up pits, strengthening of seedlings and polybag collection are applied in accordance with the technical guidance.
- Prepare report on planting flooded forest seedlings: The FiAC plays an important role in preparing reports on the results of the planting after the event is completed. This report has to be reviewed and approved by the PDAFF's director and copied to WGFFFM's at provincial and district levels and the relevant commune chiefs for information.

### **F. Maintenance of flooded forest restoration sites**

To ensure high survival and growth rates, both planted and natural seedlings in the forest restoration sites need to be maintained. Based on the actual situation of each restoration site, the seedling maintenance methods to be applied include the protection of the restoration sites from invasion of domestic animals,

cropping and wildfires as well as liberation of seedlings from oppression by water hyacinth, weeds and shrubs. Detailed techniques of flooded tree seedling maintenance are included in the training on "Tree Nursery Management and Flooded Forest Restoration Approaches" to be organized for FiAC's officers.

### **G. Seedling survival and growth rate monitoring**

It is important to assess the survival rate and growth of seedlings at the beginning of the dry season of the second year of flooded forest seedling age to know mortality and growth rates of seedlings by species and location. This assessment should be performed every two years at the same sample sites.

The main purpose of the assessment is to find out the factors that cause seedlings to die and grow slowly and to recommendations on methods to make the seedlings that were planted and will be planted in the future survived and grown better in actually geographical and biological conditions of each area, such as protection of flooded forest restoration sites from various disturbance activities, prevention of forest fires, enrichment and replacement planting, seedling maintenance and liberation, etc.

## **6. Gender Equality and child labor in implementation of the IFFPMP**

In the implementation of the IFFPMP, gender mainstreaming and child protection will be addressed in all activities, including planning process, implementation and monitoring of the plan implementation in accordance with the framework on gender equality of the FiA the MAFF, in particular the action plan of the FiA for promoting gender equality and elimination of child labor in fisheries sector (2016-2020).

To contribute to boost the equal participation of men and women in decision making and activity implementation in the working groups at commune, district, provincial levels, the Departments of Fisheries Conservation and Fisheries Affairs will work with the Gender Working Group of the FiA to ensure the negative effects of gender inequality are addressed in the implementation of this plan, providing equal opportunities for men and women in the composition of the flooded forest fire management structures at all levels, and the consideration of women's needs and barriers in the implementation of this plan.

Some considerations regarding the establishment of clear implementation mechanism to achieve gender equality through awareness raising, services and legal support are outlines below:

- Ensure equal participation of women and men in all activities of flooded forest fire prevention and management and decision-making in planning, implementation and monitoring of plan implementation, emphasizing women's workloads in it.
- Encourage women to actively participate in the WGFFFM at provincial, district and commune levels, paying attention to the objectives and interests of women.
- Provide equal opportunities for women to participate in skill training and consider their needs and interests.
- Promote the application of modern technology appropriate to women's abilities and work.
- Protect children under age of 18 and pregnant women from potentially dangers of flooded forest fire extinguishment and improve working conditions and skills for youth participation in the forest fire management by ensuring health and working safety at anywhere.
- Demonstrate the valuable roles and responsibilities of women and men in fisheries development and conservation as well as in awareness raising campaigns on participatory flooded forest fire management.

## **7. Framework of the IFFPMP**

Currently, Banteay Meanchey's FiAC has no the IFFPMP and lack of resources to respond to flooded forest fires. Many cases of flooded forest fires were reported by CFIs and local people to the relevant units, especially the FiAC and commune authority, but no any immediate intervention were acted effectively to respond the reported wildfires. Remote locations of flooded forest fires, inaccessible roads, lacks of manpower, budget and equipment also contribute to the failure. Lately, the DFC provided a number of dry powder fire extinguishing cylinders to CFIs through the FiAC for use to put out flooded forest fires as needed.

In order to support the forest fire management efforts that have been carried out by relevant stakeholders at sub-national level, the FiA in collaboration with the FAO of CAPFISH-Capture, developed the 5-year IFFPMP for 2021-2025) with the following framework.

## 7.1 Implementation period

The mandate of the flooded forest fire prevention and management plan is five year (2022 – 2026).

## 7.2 Goal

Flooded forests in Banteay Meanchey province are well managed and protected, and flooded forest cover increased under the effective management of flooded forest fire management mechanisms at provincial, district and commune levels with fully participation of relevant stakeholders.

## 7.3 Objective

To meet the above objectives, achieving some of the following goals will contribute significantly to meet the set objectives:

- Participatory awareness and participation in prevention and management of flooded forest fires enhanced.
- Areas of flooded forests and grassland affected by wildfires dropped down significantly.
- All fire-damaged flooded forests restored through protection, maintenance and enrichment replanting to benefit ecosystems, high-nutrient organic food sources and fishing community livelihood.

## 7.4 Expected outputs

### **Expected output 1: Readily effective review, risk reduction and readiness for forest fire protection and response.**

The first result of responding to 3 "R" out of 5 "R" is a review of flooded forest fire challenges, reducing risks of flooded forest fires, and readiness of forces and equipment to put out flooded forest fires immediately in good cooperation with local authorities at all levels, relevant stakeholders, NGO partners and local communities.

Activities to be implemented to meet the first expected outputs include meetings with relevant stakeholders to discuss establishment of WGFFFM at district and provincial levels, formation of FFFPTs at commune level, extension materials needed, local awareness raising, required flooded forest fire extinguishers, training on flooded forest fire patrol techniques, supporting and strengthening flooded forest fire patrol, and Fisheries Law enforcement to prevent flooded forest destruction and fires.

### **Expected output 2: Improved responsive actions to inundated forest fires**

The second expected result focuses on coordination with local authorities, relevant institutions, CFIs and local communities to get timely intervention in extinguishing flooded forest fires. This expected output also aim to strengthen Fisheries Law enforcement and increase successful rate of prosecution against illegal activities in flooded forest destruction, both inside and outside the judicial system.

### **Expected output 3: Improved restoration of fire-damaged and degraded flooded forests**

The third expected output focuses on improvement of cover of fire-affected flooded forests through application of different flooded forest restoration approaches such as prevention of flooded forest encroachment for farming, banning domestic animal grazing in the restoration sites, prevention of reoccurrence of forest fires, enrichment planting and Assisted Natural Regeneration (ANR).

## 7.5 Estimated budget

The budget for implementing the five-year IFFPMP is estimated at about US\$ 480,350 in total.

The IFFPMP for Banteay Meanchey province is compiled in accordance with “**Guidelines for Developing Tonle Sap Inundated Forest Fire Management Plans**” developed by CAPFISH-Capture Project and 5 R’s Principle (Review, Risk Reduction, Readiness, Response and Restoration). This principle is very useful in providing sufficient information to write the IFFPMP for the implementers to ensure that they can achieve the above three expected outputs.

The IFFPMP is also developed based on Community Fisheries Management Plans (CFiMPs), which is a way to integrate community decisions into implementation of the IFFPMPs as part of the implementation of CFiMPs. This plan not only engages all stakeholders provide techniques, equipment and workforces in strategic implementation of prevention and management of flooded forest fires but also raise local awareness on impacts of the forest fires, flooded forest restoration approaches as well as the law, sub-decrees and regulations related to clearing and burning flooded forests, which are stated in Articles 26, 27

and 28, Chapter 6 and Article 98, Chapter 15 of the Fisheries Law and Sub-Decree No.197 on Boundary Demarcation of Flooded Forests Surrounding Tonle Sap Lake in the Six Provinces.

Both men and women, especially those vulnerable to flooded forest fires, play an equally important role in participating in the 5 R's principle for flooded forest fire prevention and management. In this context, however, protection of women and children from hazardous works of flooded forest fires must be guaranteed.

On the other hand, local authorities and CFIs that have experienced flooded forest fires in their management areas must make the local people aware of the importance of the wildfire prevention and management in connection with public interest of fisheries resources in the areas as majority of the local communities depend on fishery resources, including the use of floodplain lands for agricultural production.

## 8. Monitoring and Evaluation Framework

To monitor and evaluate the IFFPMP's implementation thoroughly, a monitoring and evaluation team must be set up with members from representatives of relevant institutions at national and sub-national levels, such as:

- **Relevant institutions at national level:** DFC and DFA of FiA, Ministry of Agriculture, Forestry and Fisheries, relevant institutions and others development partners.
- **Relevant institutions at sub-national level:** Local authorities at provincial, district and commune levels, PDAFF, FiAC, provincial relevant departments and others development partners in the province of Banteay Meanchey.

The FAO's Monitoring and Evaluation Officer (MEO) will support FiA to do a survey on flooded forest fire prevention and management and develop baseline survey to be used by the Monitoring and Evaluation Team (MET) to follow up, monitor and evaluate the impact of the IFFPMP's implementation.

The MOE will continue assisting the MET to develop the monitoring and evaluation system and update the monitoring and evaluation based on reports on the results of the plan. A brief framework for monitoring and evaluation of the IFFPMP's Implementation will be prepared separately for chiefs of the MET and senior officials of relevant institutions to use easily in a short time period for monitoring and evaluation of the results of the plan implementation.

This monitoring and evaluation will be carried out by the MET to determine the extents of the IFFPMP's objectives, goals and expected outputs achieved, cost effectiveness and the overall impacts of flooded forest fire prevention and management in Banteay Meanchey province.

Additionally, the MET will gather the most updated information/data on number of cases, locations and scopes of flooded forest fires, plant species burnt, suspects caused flooded forest fires, workforces participated and equipment used in flooded forest fire management process, flooded forest fire intervention effectiveness, operational costs and strategic challenges, etc. to recommend, direct and better the IFFPMP's implementation.

Internal assessment will be conducted annually. Assessment by external experts should be carried out twice a year, in the middle of and before the end of the IFFPMP's implementation. The DFC and DFA prepare terms of reference of the external evaluators, manage the recruitment process and oversee the assessment result under cooperation and support from FAO.

Aerial photos shot by drones during field mission provide help detailed views in each area of topography, land and forest covers, land use patterns, flooded forest sites newly cleared and burnt, dry flammable wastes on the land, hotspot areas where are sources of causing flooded forest fires, existing physical infrastructures, routes for traveling and transporting (waterways and by land), etc. Such images will help identify flooded forest fire locations susceptible to wildfires, factors that can trigger flooded forest fires, access to the floodplain for extinguishing flooded forest fires that provide easiness for developing the IFFPMP.

The leaders of the FiAC and the provincial and district administrations who are the chiefs of the WGFFM will monitor and evaluate the implementation of the IFFPMP as needed in the fields by using the monitoring and evaluation framework to evaluate the actual results, impacts of the plan implementation and accountability.

## 9. Activity and budget of the IFFPMP at provincial level for Banteay Meanchey province (2022-2026)

No	Activities	Indicators (5 years)	Responsible		Budget (2022- 2026)	2022 (by quarter)				2023 (by quarter)				2024 (by quarter)				2025 (by quarter)				2026 (by quarter)				
			Lead	Support		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
<b>1</b>	<b>Output 1: Effective review, risk reduction and readiness for forest fire protection.</b>					<b>211,520</b>																				
1.1	<b>Review forest fire behavior and lessons learnt on forest fire prevention and intervention and for restoration approach have been applied.</b>					<b>12,600</b>																				
1.1.1	Conduct consultation meetings with stakeholders at commune level to collect information on forest behavior and forest fire prevention, intervention and restoration approach have been applied (100\$ x 6 meetings x 5 years).	50 meetings at commune level. 10 reports at district level.	FiA	FiAC	3,000	600				1,000				1,000				1,000				1,000				
						6 meetings 2 reports				6 meetings 2 reports				6 meetings 2 reports				6 meetings 2 reports				6 meetings 2 reports				
						H			H				H				H				H				H	
1.1.2	Conduct site observation at fire-affected flooded forests to gather information on physical condition, scope of damages, land use patterns, coordinates and mapping fire-affected flooded forests at district level [(100\$ x 3 days x 6 communes) + (60\$ x 2 maps) x 5 years.	10 reports at district level	FiA	FiAC	9,600	1,800				1,800				1,800				1,800				1,800				
						2 reports				2 reports				2 reports				2 reports				2 reports				
						H	H			H	H			H	H			H	H			H	H			
1.1.3	Organize provincial meeting to present and endorse the IFFPMP.	1 meeting Signed IFFPMP				200																				
						1 meeting																				
						H																				
1.2	<b>Risk Reduction: Reduce risks of forest fires by promoting local awareness on participatory forest fire prevention and intervention.</b>					<b>58,200</b>																				
1.2.1	Produce and distribute posters for promoting awareness of local communities and involved stakeholders (1.5\$ x 100 posters x 6 communes x 5 years).	3,000 posters	FiA	FiAC	4,500	900				900				900				900				900				
						600 posters				600 posters				600 posters				600 posters				600 posters				
						H				H				H				H				H				
1.2.2	Produce and erect educational signboards at crowded sites and along main roads in the floodplains (300\$ x 2 signboards x 6 communes).	12 signboards	FiAC	Local authorities	3,600					2,100				1,500												
										7 signboards				5 signboards												
										H				H												
1.2.3	Develop lists of stakeholders (tractor/power tiller owners, farmers, fisherfolks, buffalo/cowherds, hunters, and so on) involved in businesses in Zone 2 and 3 at commune level (100\$ x 6 communes x 5 years).	6 lists to be updated on yearly basis.	FiAC	Local authorities	3,000	600				600				600				600				600				
						6 lists				6 updated lists				6 updated lists				6 updated lists				6 updated lists				
									H				H				H				H				H	
1.2.4	Promote awareness of the target communities on participatory forest fire management, Fisheries Law, forest fire-related sub-decree, norms, policies and regulations (150\$ x 2 meetings x 6 communes x 5 years).	60 meetings	FiAC	Local authorities	9,000	1,800				1,800				1,800				1,800				1,800				
						12 meetings				12 meetings				12 meetings				12 meetings				12 meetings				
						H	H			H	H			H	H			H	H			H	H			
1.2.5	Set up, structure and restructure Flooded Forest Fire Patrol Teams (FFFPTs) and develop monthly forest fire patrol plan (100\$ x 1 meeting x 6 communes).	6 teams	FiAC	Local authorities	600	600																				
						6 teams																				
						H																				
1.2.6	Conduct regular forest fire patrol, 5 days/month (250\$ x 4 months x 6 communes x 5 years).	600 days	FiAC	Local authorities	37,500	7,500				7,500				7,500				7,500				7,500				
						120 days				120 days				120 days				120 days				120 days				
						H	H			H	H			H	H			H	H			H	H			
1.3	<b>Readiness: prepare structures, equipment and personnel for forest fire prevention and intervention.</b>					<b>140,720</b>																				
1.3.1	<b>Equip FFFPTs with forest fire extinguishing tools and strengthen coordination among WGFFM at provincial and district and CFFPTs at commune level.</b>					<b>89,220</b>																				
1.3.1.1	Meeting with district and provincial administrations to establish WGFFM at district and provincial levels (100\$ x 8 meetings).	-1 WGFFM at provincial level -3 WGFFM at district level	FiA	PDAFF/FiAC	900	900																				
						6 meetings																				
						H																				
1.3.	Organize annual WGFFM meetings at provincial level to discuss challenges	5 meetings	FiA	FiAC/PDAFF	8,500	1,700				1,700				1,700				1,700				1,700				



1.2	faced, interventions to respond the challenges for better future prevention and intervention to flooded forest fires (1,800\$ x 1 meeting x 5 years).			& WGFFFM at provincial level		1 meeting H H	1 meeting H H	1 meeting H H	1 meeting H H	1 meeting H H
1.3.1.3	Conduct quarterly WGFFM meetings at district level to discuss challenges faced, find solutions to solve the challenges and monthly forest fire patrol plan (450\$ x 2 meeting x 2 districts x 5 years).	20 meetings	FiAC's division	District authority	8,400	1,680 4 meetings H H	1,680 4 meetings H H	1,680 4 meetings H H	1,680 4 meetings H H	1,680 4 meetings H H
1.3.1.4	Procure and purchase power tillers equipped with 2 motorized pumps, 1,000-liter water tank and 2 water pressure guns and 2 roles of hose (3,800\$ x 1 unit x 5 communes).	5 units	FiA	FiAC	19,000		11,400 3 units H	7,600 2 units H		
1.3.1.5	Procure and purchase big motorcycles for forest fire patrol teams (3,200\$ x 7 motorcycles)	7 units	FiA	FiAC	22,400		9,600 3 units H H	6,400 2 units H H	6,400 2 units H H	
1.3.1.6	Procure and purchase motorcycles (125 dream) for forest fire patrol teams (2,500\$ x 3 motorcycles)	3 units	FiA	FiAC	7,500		5,000 2 units H	2,500 1 unit H		
1.3.1.7	Procure and purchase portable forest fire extinguishing tools (first aid, camping tents, knapsacks, portable water pump sprayer, goggle, boot, binocular,...) to the patrol teams (1,200\$ x 2 sets x 6 communes)	12 sets	FiA	FiAC	14,400		7,200 6 sets H		7,200 6 sets H	
1.3.1.8	Conduct meetings with CFFPTs at commune level to distribute and guide the teams how to use and condition for using the forest fire extinguishers (100\$ x 2 meetings x 6 communes).	12 meetings	FiAC	Commune authority	1,200		600 6 meetings H		600 6 meetings H	
1.3.1.9	Attend ToT at provincial level on Flooded Forest Fire Patrol Techniques for FiAC officers and WGFFM's members (45\$ x 3ps x 2 districts x 4 days x 2 trainings)	2 courses	FiA	FiAC	1,440	720 1 course H		720 1 course H		
1.3.1.10	Conduct 2-day training on Flooded Forest Fire Patrol Techniques at district level for FFFPTs [(20\$ x 25 ps x 2 days) + (45\$ x 3 days x 2 trainers) + (100\$ training materials)] x 2 districts x 2 trainings.	4 courses	FiAC	WGFFFM at district level	5,480		2,740 2 courses H		2,740 2 courses H	
<b>1.3.2 Build physical infrastructures for forest fire prevention</b>					<b>51,500</b>					
1.3.2.1	Build watch towers for the commune forest fire patrol teams to observe forest fires (8,000\$ x 2 towers).	2 units	FiA	FiACs & local authorities	16,000		16,000 2 unit H H			
1.3.2.2	Rehabilitate natural ponds to retain water for putting forest fires and fish conservation (5,500\$ x 3 ponds).	3 locations	FiA	FiACs & local authorities	16,500		11,000 2 sites H H	5,500 1 site H H		
1.3.2.3	Establish and maintain firebreaks to prevent the spread of flooded forest fires.	10 km	FiA	FiACs & local authorities	16,000		5,000 5 km (new) H H	5,000 5 km (new) H H	3,000 10 km (maintained) H H	3,000 10 km (maintained) H H
1.3.2.4	Install an antenna for supporting the FFFPT's members to communicate each oather via walkie talkies.	1 anttena	FiA	FiACs & local authorities	3,000		3,000 1 unit H H			
<b>2 Output 2: Improved response actions to fires in inundated forest areas</b>					<b>56,820</b>					
2.1	Follow up daily report and stand by for urgent forest fire intervention as required by the patrol teams (500\$ x 45 cases)	45 cases	FiAC	Local authorities	22,500	6,500 13 cases H H	5,400 11 cases H H	4,500 9 cases H H	3,500 7 cases H H	2,500 5 cases H H
2.2	Attend ToT at national level on Collecting Evidence, Preparing Offence Reports for FiAC's trainers (45\$ x 4 ps x 4 days).	1 course	FiA	FiAC	720		720 1 course H			

2.3	Strengthen law enforcement against offenders who set forest fires and/or encroached inundated forest lands illegally (150\$ x 2 cases x 6 communes x 5 years).	60 cases	FiAC	Local authorities	9,000	2,700 18 cases	2,250 15 cases	1,800 12 cases	1,350 9 cases	900 6 cases										
						H	H			H	H			H	H			H	H	
2.4	Maintain forest fire extinguishing equipment and buy additional required forest fire extinguishing tools (100\$ x 5 months x 6 communes x 5 years).	Lump sum	FiAC	Local authorities	15,000	3,000 L.sum	3,000 L.sum	3,000 L.sum	3,000 L.sum	3,000 L.sum										
						H	H			H	H			H	H			H	H	
2.5	Organizing provincial workshop for exchanging lessons learnt and experiences on flooded forest fire prevention and intervention (5,600\$ x 1 time).	1 workshop	FiA	FiAC	5,600			5,600 1 workshop												
2.6	Reward individuals who participated actively or injured in the forest fire prevention and intervention (100\$ x 40 people)	40 people	FiAC	Local authorities	4,000	1,200 12 persons	1,000 10 persons	800 8 persons	700 7 persons	500 5 persons										
						H	H			H	H			H	H			H	H	
<b>3</b>	<b>Output 3: Improved restoration of fire damaged areas of inundated forests.</b>				<b>205,910</b>															
3.1	Conduct rapid assessment to identify reasonably technical-sound approaches for flooded forest restoration, including mapping [(100\$ x 3 days x 2 districts) + (60\$ x 2 maps)] x 5 years	10 reports at district level	FiA/FAO	FiAC	3,600	720 2 reports	720 2 reports	720 2 reports	720 2 reports	720 2 reports										
						H			H					H				H		
3.2	Mark boundaries of burnt forest sites by concrete poles with small signboards (60\$ x 800 poles).	800 poles	FiAC	CFis & local authorities	36,000	10,800 180 poles	9,000 150 poles	7,200 120 poles	5,400 90 poles	3,600 60 poles										
						H	H			H	H			H	H			H	H	
3.3	Participate in workshops on tree nursery management and flooded forest restoration approaches (1,700\$ x 2 workshops)	2 workshops	FiA	FAO	3,400		1,700 1 events		1,700 1 events											
							H			H										
3.4	Conduct consultation meetings at commune level with stakeholders to discuss flooded forest restoration plan (150\$ x 6 meetings x 5 years).	30 meetings	FiAC	Local authorities	4,500	900 6 meetings	900 6 meetings	900 6 meetings	900 6 meetings	900 6 meetings										
						H			H					H				H		
3.5	Support CFis to establish tree nursery and produce flooded forest seedlings for planting in flooded forest restoration sites (800\$ x 1 nursery x 2 districts x 5 years).	10 nurseries	FiAC	CFis	8,000	1,600 2 nurseries	1,600 2 nurseries	1,600 2 nurseries	1,600 2 nurseries	1,600 2 nurseries										
						H	H			H	H							H	H	
3.6	Support and monitor tree planting carried out by local communities in flooded forest restoration sites, including tree planting materials (L. sump: 5,850ha)	130 ha	FiAC	CFi/local communities	5,850	1,170 26 ha	1,170 26 ha	1,170 26 ha	1,170 26 ha	1,170 26 ha										
						H	H			H	H			H	H			H	H	
3.7	Cost for seedlings, transportation and planting (1\$ x 1,000 seedlings x 130 ha).	130 ha 130,000 seedlings	FiAC	CFi/local communities	130,000	26,000 -26 ha -26,000 seedlings	26,000 -26 ha -26,000 seedlings	26,000 -26 ha -26,000 seedlings	26,000 -26 ha -26,000 seedlings	26,000 -26 ha -26,000 seedlings										
						H			H					H				H		
3.8	Maintain flooded tree seedlings in the forest restoration sites (40\$/ha x 312 ha)	312 hectares	FiAC	CFis	12,480	1,040 26 ha	2,080 52 ha	3,120 78 ha	3,120 78 ha	3,120 78 ha										
						H	H			H	H			H	H			H	H	
3.9	Conduct seedling survival and growth rate monitoring of forest restoration sites (lump sum: 2,080\$/104ha).	104 hectares	FiAC	CFis	2,080			675 26 ha	675 26 ha	1,350 52 ha										
								H		H				H				H		
<b>4</b>	<b>Backstopping, monitoring and evaluation of the implementation of the IFFPMP.</b>				<b>6,100</b>															
4.1	Participate in baseline survey to be conducted by the working teams of FiA and CAPFISH project (lump sum: 900\$).	1 time	FiA/FAO	FiAC, WGFFM	700	700 1 time														
						H														
4.2	Participate in monthly backstopping missions of FiA's working teams to support and direct the IFFPMP's implementation (45\$ x 2 persons x 6 months x 2 districts x 5 years).	90 times	FiAC	FiAC, WGFFM	5,400	1,080 10 times	810 18 times	810 18 times	810 18 times	810 18 times										
						H	H			H	H			H	H			H	H	
<b>Grand Total:</b>					<b>480,350</b>															



1.2	challenges faced, interventions to respond the challenges for better future prevention and intervention to flooded forest fires (1,800\$ x 1 meeting x 5 years).		PDAFF	WGFFFM at provincial level		1 meeting	1 meeting	1 meeting	1 meeting	1 meeting
						H H	H H	H H	H H	H H
1.3.	Conduct quarterly WGFFM meetings at district level to discuss challenges faced, find solutions to solve the challenges and monthly forest fire patrol plan (420\$ x 2 meeting x 5 years).	20 meetings	FiAC's division	WGFFFM at district level	4,200	840	840	840	840	840
1.3						2 meetings	2 meetings	2 meetings	2 meetings	2 meetings
						H H	H H	H H	H H	H H
1.3.	Procure and purchase power tillers equipped with 2 motorized pumps, 1,000-liter water tank and 2 water pressure guns and 2 roles of hose (3,800\$ x 3 units).	3 units	FiA	FiAC	11,400		7,600	3,800		
1.4							2 units	1 unit		
							H	H		
1.3.	Procure and purchase big motorcycles for forest fire patrol teams (3,200\$ x 5 motorcycles)	5 units	FiA	FiAC	16,000		6,400	6,400	3,200	
1.5							2 units	2 units	1 units	
							H	H H	H H	
1.3.	Procure and purchase motorcycles (125 dream) for forest fire patrol teams (2,500\$ x 2 motorcycles)	2 units	FiA	FiAC	5,000		2,500	2,500		
1.6							1 unit	1 unit		
							H	H		
1.3.	Procure and purchase portable forest fire extinguishing tools (first aid, tents, knapsacks, portable water pump sprayer, goggle, boot, binocular,..) to the patrol teams (1,200\$ x 2 sets x 5 communes)	10 sets	FiAC	Local authorities	12,000		6,000		6,000	
1.7							5 sets		5 sets	
							H		H	
1.3.	Conduct meetings with CFFPTs at commune level to distribute and guide the teams how to use and condition for using the forest fire extinguishers (100\$ x 2 meetings x 5 communes).	10 meetings	FiAC	Commune authority	1,000		500		500	
1.8							5 meetings		5 meetings	
							H		H	
1.3.	Attend ToT at provincial level on Flooded Forest Fire Patrol Techniques for FiAC officers and WGFFM's members (45\$ x 2ps x 4 days x 2 trainings)	2 courses	FiA	FiAC	720		360		360	
1.9							1 course		1 course	
							H		H	
1.3.	Conduct 2-day training on Flooded Forest Fire Patrol Techniques at district level for FFFPTs [(20\$ x 25 ps x 2 days) + (45\$ x 3 days x 2 trainers) + (100\$ training materials)] x 2 trainings.	4 courses	FiAC	WGFFFM at district level	2,740		1,370		1,370	
1.10							1 course		1 course1	
							H		H	
<b>1.3.2</b>	<b>Build physical infrastructures for forest fire prevention</b>				<b>19,000</b>					
1.3.2.	Build watch towers for the commune forest fire patrol teams to observe forest fires (8,000\$ x 2 towers).	2 units	FiA	FiAC	16,000		16,000			
1							2 unit			
							H H			
1.3.2.	Install an antenna for supporting the FFFPT's members to communicate each oather via walkie talkies.	1 anttena	FiA	FiAC	3,000		3,000			
2							1 unit			
							H H			
<b>2</b>	<b>Output 2: Improved response actions to fires in inundated forest areas</b>				<b>40,593</b>					
2.1	Follow up daily report and stand by for urgent forest fire intervention as required by the patrol teams (500\$ x 30 cases)	45 cases	FiAC	Local authorities	15,000		4,500	4,000	3,000	2,000
							9 cases	8 cases	6 cases	4 cases
							H H	H H	H H	H H
2.2	Attend ToT at national level on Collecting Evidence, Preparing Offence Reports for FiAC's trainers (45\$ x 2 ps x 4 days).	1 course	FiA	FiAC	360			360		
								1 course		
								H		
2.3	Strengthen law enforcement against offenders who set forest fires and/or encroached inundated forest lands illegally (150\$ x 2 cases x 5 communes x 5 years).	40 cases	FiAC	Local authorities	6,000		1,800	1,500	1,200	900
							12 cases	10 cases	8 cases	6 cases
							H H	H H	H H	H H
2.4	Maintain forest fire extinguishing equipment and buy additional required forest fire extinguishing tools (100\$ x 5 months x 5 communes x 5 years).	Lump sump	FiAC	Local authorities	12,500		2,500	2,500	2,500	2,500
							L.sum	L.sum	L.sum	L.sum
							H H	H H	H H	H H
2.5	Organizing provincial workshop for exchanging lessons learnt and	1 workshop	FiA	FiAC	3,733				3,733	
									1 workshop	



## 10.2 Activity and budget of inundated forest fire management for Mongkol Borey district

No	Activities	Indicators (5 years)	Responsible		Budget (2022-2026)	2022 (by quarter)				2023 (by quarter)				2024 (by quarter)				2025 (by quarter)				2026 (by quarter)							
			Lead	Support		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
<b>1</b>	<b>Output 1: Effective review, risk reduction and readiness for forest fire protection.</b>					<b>74,343</b>																							
<b>1.1</b>	<b>Review forest fire behavior and lessons learnt on forest fire prevention and intervention and for restoration approach have been applied.</b>					<b>2,100</b>																							
1.1.1	Conduct consultation meetings with stakeholders at commune level to collect information on forest behavior and forest fire prevention, intervention and restoration approach have been applied (100\$ x 1 meeting x 5 years).	55 meetings at commune level. 5 reports at district level.	FiA	FiAC	500	100		100		100		100		100		100		100		100		100		100					
						1 meeting	1 report	1 meeting	1 report	1 meeting	1 report	1 meeting	1 report	1 meeting	1 report	1 meeting	1 report	1 meeting	1 report	1 meeting	1 report	1 meeting	1 report	1 meeting	1 report				
						H		H		H		H		H		H		H		H		H		H		H		H	
1.1.2	Conduct site observation at fire-affected forests to gather information on physical condition, scope of damages, land use patterns, coordinates and mapping fire-affected flooded forests at district level [(100\$ x 3 days x 1 commune) + (60\$ x 1 map) x 5 years.	5 reports at district level	FiA	FiAC	1,600	320		320		320		320		320		320		320		320		320		320					
						1 report	1 report	1 report	1 report	1 report	1 report	1 report	1 report	1 report	1 report	1 report	1 report	1 report	1 report	1 report	1 report	1 report	1 report	1 report	1 report				
						H	H			H	H			H	H			H	H			H	H			H	H		
<b>1.2</b>	<b>Risk Reduction: Reduce risks of forest fires by promoting local awareness on participatory forest fire prevention and intervention.</b>					<b>9,700</b>																							
1.2.1	Produce and distribute posters for promoting awareness of local communities and involved stakeholders (1.5\$ x 100 posters x 5 years).	500 posters	FiA	FiAC	750	150		150		150		150		150		150		150		150		150		150					
						100 posters	100 posters	100 posters	100 posters	100 posters	100 posters	100 posters	100 posters	100 posters	100 posters	100 posters	100 posters	100 posters	100 posters	100 posters	100 posters	100 posters	100 posters	100 posters	100 posters				
						H		H		H		H		H		H		H		H		H		H		H		H	
1.2.2	Produce and erect educational signboards at crowded sites and along main roads in the floodplains (300\$ x 2 signboards).	2 signboards	FiAC	Local authorities	600	600		2 signboards																					
								H																					
1.2.3	Develop lists of stakeholders (tractor/power tiller owners, farmers, fisherfolks, buffalo/cowherds, hunters, and so on) involved in businesses in Zone 2 and 3 at commune level (100\$ x 1 commune x 5 years).	5 lists to be updated yearly basis.	FiAC	Local authorities	500	100		100		100		100		100		100		100		100		100		100					
						1 list	1 updated list	1 updated list	1 updated list	1 updated list	1 updated list	1 updated list	1 updated list	1 updated list	1 updated list	1 updated list	1 updated list	1 updated list	1 updated list	1 updated list	1 updated list	1 updated list	1 updated list	1 updated list	1 updated list				
							H		H		H		H		H		H		H		H		H		H		H		H
1.2.4	Promote awareness of the target communities on participatory forest fire management, Fisheries Law, forest fire-related sub-decree, norms, policies and regulations (150\$ x 2 meetings x 1 commune x 5 years).	10 meetings	FiAC	Local authorities	1,500	300		300		300		300		300		300		300		300		300		300					
						2 meetings	2 meetings	2 meetings	2 meetings	2 meetings	2 meetings	2 meetings	2 meetings	2 meetings	2 meetings	2 meetings	2 meetings	2 meetings	2 meetings	2 meetings	2 meetings	2 meetings	2 meetings	2 meetings	2 meetings				
						H	H			H	H			H	H			H	H			H	H			H	H		
1.2.5	Set up, structure and restructure Flooded Forest Fire Patrol Teams (FFFPTs) and develop monthly forest fire patrol plan (100\$ x 1 meeting x 5 communes).	1 team	FiAC	Commune authority	100	100		1 team																					
						H																							
1.2.6	Conduct regular forest fire patrol, 4 days/month (250\$ x 5 months x 1 commune x 5 years).	100 days	FiAC	Commune authorities	6,250	6,250		100 days		100 days		100 days		100 days		100 days		100 days		100 days		100 days		100 days					
						H	H			H	H			H	H			H	H			H	H			H	H		
<b>1.3</b>	<b>Readiness: prepare structures, equipment and personnel for forest fire prevention and intervention.</b>					<b>62,543</b>																							
<b>1.3.1</b>	<b>Equip FFFPTs with forest fire extinguishing tools and strengthen coordination among WGFFM at provincial and district and CFFPTs at commune level.</b>					<b>30,093</b>																							
1.3.1.1	Meeting with district administrations to establish WGFFM at district level (450\$/2 meetings).	Decision Letter for establishment of WGFFM at district level.	FiAC	PDAFF/FiAC	450	450		2 meetings																					
						H																							
1.3.1.2	Organize annual WGFFM meetings at provincial level to discuss challenges faced, interventions to respond the challenges for better future prevention and intervention to flooded forest fires (566\$ x 1 meeting x 5 years).	5 meetings	FiAC/FiAC	FiAC & WGFFM at provincial level	2,883	566		566		566		566		566		566		566		566		566		566					
						1 meeting	1 meeting	1 meeting	1 meeting	1 meeting	1 meeting	1 meeting	1 meeting	1 meeting	1 meeting	1 meeting	1 meeting	1 meeting	1 meeting	1 meeting	1 meeting	1 meeting	1 meeting	1 meeting	1 meeting				
						H	H			H	H			H	H			H	H			H	H			H	H		



1.3.1.3	Conduct quarterly WGFFM meetings at district level to discuss challenges faced, find solutions to solve the challenges and monthly forest fire patrol plan (420\$ x 2 meeting x 5 years).	20 meetings	FiAC's division	WGFFM at district level	4,200	840 2 meetings	840 2 meetings	840 2 meetings	840 2 meetings	840 2 meetings
						H H	H H	H H	H H	H H
1.3.1.4	Procure and purchase power tillers equipped with 2 motorized pumps, 1,000-liter water tank and 2 water pressure guns and 2 roles of hose (3,800\$ x 2 units).	2 units	FiA	FiAC	7,600		3,800 1 unit	3,800 1 unit		
							H	H H		
1.3.1.5	Procure and purchase big motorcycles for forest fire patrol teams (3,200\$ x 2 motorcycles)	2 units	FiA	FiAC	6,400		3,200 1 units		3,200 1 units	
							H		H	
1.3.1.6	Procure and purchase motorcycles (125 Dream) for forest fire patrol teams (2,500\$ x 1 motorcycle)	1 unit	FiA	FiAC	2,500		2,500 1 unit			
							H			
1.3.1.6	Procure and purchase portable forest fire extinguishing tools (first aid, tents, knapsacks, portable water pump sprayer, goggle, boot, binocular,..) to the patrol teams (1,200\$ x 2 sets x 1 commune)	2 sets	FiAC	Local authorities	2,400		1,200 1 set		1,200 1 set	
							H		H	
1.3.1.7	Conduct meetings with CFFPT at commune level to distribute and guide the teams how to use and condition for using the forest fire extinguishers (100\$ x 2 meetings x 1 commune).	2 meetings	FiAC	Commune authority	200		100 1 meeting		100 1 meeting	
							H		H	
1.3.1.8	Attend ToT at provincial level on Flooded Forest Fire Patrol Techniques for FiAC officers and WGFFM's members (45\$ x 2ps x 4 days x 2 trainings)	2 courses	FiA	FiAC	720	360 1 course		360 1 course		
						H		H		
1.3.1.9	Conduct 2-day training on Flooded Forest Fire Patrol Techniques at district level for FFFPTs [(20\$ x 25 ps x 2 days) + (45\$ x 3 days x 2 trainers) + (100\$ training materials)] x 2 trainings.	4 courses	FiAC	WGFFM at district level	2,740		1,370 1 course		1,370 1 course	1
							H		H	
<b>1.3.2</b>	<b>Build physical infrastructures for forest fire prevention</b>				<b>32,450</b>					
1.3.2.1	Restore natural ponds to retain water for putting out flooded forest fires and conserve brood stock (5,500\$ x 3 ponds).	3 locations	FiA	FiAC	16,450		11,000 2 locations	5,500 1 location		
							H H			
1.3.2.2	Eatsblish and maintain firebreaks to prevent flooded forest fires (1,600\$ x 10 km).	10 km	FiA	FiAC	16,000	5,000 5 km (new)	5,000 5 km (new)	2,000 10 km (maintained)	2,000 10 km (maintained)	2,000 10 km (maintained)
						H H	H H	H H	H H	H H
<b>2</b>	<b>Output 2: Improved response actions to fires in inundated forest areas</b>				<b>16,227</b>					
2.1	Follow up daily report and stand by for urgent forest fire intervention as required by the patrol teams (500\$ x 15 cases)	15 cases	FiAC	Local authorities	7,500	2,500 5 cases	1,500 3 cases	1,500 3 cases	1,000 2 cases	1,000 2 cases
						H H	H H	H H	H H	H H
2.2	Attend ToT at national level on Collecting Evidence, Preparing Offence Reports for FiAC's trainers (45\$ x 2 ps x 4 days).	1 course	FiA	FiAC	360	360 1 course				
						H				
2.3	Strengthen law enforcement against offenders who set forest fires and/or encroached inundated forest lands illegally (150\$ x 2 cases x 1 commune x 5 years).	20 cases	FiAC	Local authorities	3,000	900 6 cases	750 5 cases	600 4 cases	450 3 cases	300 2 cases
						H H	H H	H H	H H	H H
2.4	Maintain forest fire extinguishing equipment and buy additional required forest fire extinguishing tools (100\$ x 5 months x 1 commune x 5 years).	Lump sump	FiAC	Local authorities	2,500	500 L.sum	500 L.sum	500 L.sum	500 L.sum	500 L.sum
						H H	H H	H H	H H	H H
2.5	Organizing provincial workshop for exchanging lessons learnt and experiences on flooded forest fire prevention and intervention (1,867\$)	1 workshop	FiA	FiAC	1,867			1,867 1 workshop		
								H		
2.6	Reward individuals who participated actively or injured in the forest fire prevention and intervention (100\$ x 10 people)	10 people	FiAC	Local authorities	1,000	300 3 persons	200 2 persons	200 2 persons	200 2 persons	100 1 person
						H H	H H	H H	H H	H H



3 Output 3: Improved restoration of fire damaged areas of inundated forests.					65,930					
3.1	Conduct rapid assessment to identify reasonably technical-sound approaches for flooded forest restoration, including mapping [(100\$ x 3 days) + (60\$ x 1 map)] x 5years	10 reports at district level	FiA/FAO	FiAC	1,200	240	240	240	240	240
						1 report	2 reports	2 reports	2 reports	2 reports
3.2	Mark boundaries of burnt flooded forest sites by concrete poles with small signboards (60\$ x 200 poles).	200 poles	FiAC	CFis and local authorities	12,000	3,600	3,000	2,400	1,800	1,200
						60 poles	50 poles	40 poles	30 poles	20 poles
3.3	Participate in workshops on tree nursery management and flooded forest restoration approaches (850\$ x 2 workshops)	2 workshops	FiA	FAO	1,700	850			850	
						1 events			1 events	
3.4	Conduct consultation meetings at commune level with stakeholders to discuss flooded forest restoration plan (150\$ x 1 meeting x 5 years).	15 meetings	FiAC	Local authorities	750	150	150	150	150	150
						1 meeting	1 meeting	1 meeting	1 meeting	1 meeting
3.5	Support CFis to establish tree nursery and produce flooded forest seedlings for planting in flooded forest restoration sites (800\$ x 1 nursery x 5 years)	5 nurseries	FiAC	CFis	4,000	800	800	800	800	800
						1 nursery	1 nursery	1 nursery	1 nursery	1 nursery
3.6	Support and monitor tree planting carried out by local communities in flooded forest restoration sites, including tree planting materials (1,800 ha/40 ha)	40 ha	FiAC	CFi/local community	1,800	360	360	360	360	360
						8 ha	8 ha	8 ha	8 ha	8 ha
3.7	Cost for seedlings, transportation and planting (1\$ x 1,000 seedlings x 40 ha).	40 ha 40,000 seedlings	FiAC	CFi/local community	40,000	18,000	18,000	18,000	18,000	18,000
						-8 ha -8,000 seedlings	-8 ha -8,000 seedlings	-8 ha -8,000 seedlings	-8 ha -8,000 seedlings	-8 ha -8,000 seedlings
3.8	Maintain flooded tree seedlings in flooded forest restoration sites (40\$/ha x 96 ha)	96 ha	FIAC	CFis	3,840	320	640	960	960	960
						8 ha	16 ha	24 ha	24 ha	24 ha
3.9	Conduct seedling survival and growth rate monitoring of forest restoration sites (lump sum: 640\$/32 ha).	32 hectares	FiAC	CFis	640			160	160	320
								8 ha	8 ha	16 ha
<b>4 Backstopping, monitoring and evaluation of the implementation of the IFFPMP.</b>					<b>2,933</b>					
4.1	Participate in baseline survey to be conducted by the working teams of FiA and CAPFISH project (lump sum: 233\$).	1 time	FiA/FAO	FiAC, WGFFM	233	233				
						1 time				
4.2	Participate in monthly backstopping missions of FiA's working teams to support and direct the IFFPMP's implementation (45\$ x 2 persons x 6 months x 5 years).	60 times	FiAC	FiAC, WGFFM	2,700	540	540	540	540	540
						12 times	12 times	12 times	12 times	12 times
<b>Grand Total:</b>					<b>159,433</b>					

# 11. Annexes

## Annex 1: List of flooded forest species in the floodplains of Banteay Meanchey province

ល.រ	ឈ្មោះខ្មែរ ( Khmer Name )	ឈ្មោះវិទ្យាសាស្ត្រ ( Scientific Name )
១	កក់ត្រុង ឬ តាតុក	<i>Cyperus elatus</i>
២	កក់ត្រាម	<i>Cyperus kyllingia or nemoralis</i>
៣	កប្បាលប្រៃ	<i>Croton krabas or Cochlopermum religiosum</i>
៤	កញ្ជើចេញរោម	<i>Capparis microcantha (Dc.)</i>
៥	កង្កែប	<i>Neptunia oleracea</i>
៦	កណ្តក់	
៧	កង្កែបអង្គុំ	
៨	កង្កែបស្រែ	<i>Polygonum tomentosum</i>
៩	កណ្តាប់ចម្ការ	<i>Pouzolzia zeylamica</i>
១០	កង្កែប	<i>Xanthophyllum glancam</i>
១១	កង្កែប	
១២	ជ្រូក	<i>Nauclea officinalis</i>
១៣	ជ្រូក	<i>Mimusops elengil</i>
១៤	កាត្រីង ឬ ឱត្រីង	<i>Cordia Sp</i>
១៥	កាណៅ “ ដៃថ្មី ”	<i>Raphanus sativus</i>
១៦	កាតិល ឬ ក្រចៅ	<i>Corchorus capsularis</i>
១៧	កំលង់ត្រី	
១៨	កំពិលបូល ( រឿ )	<i>Catharanthus roseus</i>
១៩	កំពិលបូលក្រហម ( ឈ្មោល )	<i>Ludwigia adscenden</i>
២០	កំប្រាម	<i>Acacia caesia</i>
២១	កំប្រុក “ ឈ្មើយ ”	
២២	កំប្រុក	<i>Eichhornia crassipes</i>
២៣	ក្រ ឬ ក្រាល	<i>Quassia harmandiana</i>
២៤	ក្រគោះ ( មុះតូងប្រៃគោងកាង )	<i>Sindora maritima</i>
២៥	ក្រគោះប្រៃក	<i>Sindora “ Meritima ? ”</i>
២៦	ក្រចាប់	<i>Trapa bicornis</i>
២៧	ក្រវើង	<i>Lumnitzera racemosa (Willd)</i>
២៨	ក្រវើងក្រហម	<i>Lumnitzera coccinea (W &amp; A)</i>

២៩	ក្រចៅត្រី	<i>Hydnocarpus anthelminthica</i>
៣០	ក្រចៅត្រីតូច	<i>Hydnocarpus saigonensis</i>
៣១	ក្រចៅម	<i>Pentapetes phoenicea</i>
៣២	ក្រវាំង	<i>Popowia diospyrifolia</i>
៣៣	ក្រវាល	<i>Samandura harmendii</i>
៣៤	កោងកាងឈ្មោល	<i>Rhizophora mucronata</i>
៣៥	កោងកាងរឿ	<i>Rhizophora conjugata (Linné)</i>
៣៦	ខ្នាល	<i>Diospyros sylvatica (Roxb)</i>
៣៧	ខ្នាលមាត់	<i>Dalbergia herrida</i>
៣៨	ខ្នាយ ( មុះតូងប្រៃគោងកាង )	<i>Heritiera littoralis</i>
៣៩	ខ្នឹង ( មុះតូងប្រៃគោងកាង )	<i>Calophyllum inophyllum</i>
៤០	ខ្នើម	<i>Stephegyne pavirfolia or Mitragyna brunonis</i>
៤១	ខ្នើមមីក	<i>Stephegyne “ Diversifolia ? ”</i>
៤២	ដោលចេញត្រៀម	<i>Castanopsis pierres</i>
៤៣	ប្បាយ	<i>Heritiera littoralis</i>
៤៤	ប្បូ	<i>Cudrania cambodiana</i>
៤៥	មកត់	<i>Pistia stratiotes</i>
៤៦	មកតូច	<i>Phoenix paludosa</i>
៤៧	មកតាចា	<i>Lemna minor</i>
៤៨	មង្គុលក្រវើ	
៤៩	មង្គុលជុំ ឬ រឿខ្នាលត្រី	<i>Marsilia quadrifolia</i>
៥០	មា	<i>Butea frondosa (Roxb)</i>
៥១	មាក	<i>Nipa fruticans</i>
៥២	ម៉ក់តាំង ( មុះតូងប្រៃគោងកាង )	<i>Terminalia catappa</i>
៥៣	ម៉ែក	<i>Albizia lebbekoides</i>
៥៤	ម៉ែក	
៥៥	ម្រកែង	<i>Coccoceras anisopodium</i>
៥៦	ម្រាម	
៥៧	ម្រឹមឈ	<i>Milichdes moulins or Euphorbia millii ch-des moulins</i>
៥៨	ជំនុឈ្មោល “ ដៅកំតត ដៅ ដួងឈ្មោល ”	<i>Avicennia intermedia or Avicennia marina intermedia (Griff)</i>
៥៩	ឆាំត្រីង	<i>Cynometra “ Inaequifolia ? ”</i>
៦០	ដើមខាប	<i>Dasymaschalon lomentaceum</i>

៦១	ឈូក	<i>Nelumbo nucifera</i>
៦២	ឈើត្រី	<i>Excoecaria agallocha (Lu)</i>
៦៣	រៀ	<i>Morinda</i>
៦៤	រៀមីក ឬ រៀស្យាត	<i>Morinda persicaefolia</i>
៦៥	រោងក្អម	
៦៦	របៀបក្រាម	<i>Antidesma ghaesembilla</i>
៦៧	រោងកង	<i>Tetracera scabdens (L) or Tetracera sarmentosa</i>
៦៨	រំលោ	<i>Gardenia Sp or Angkorensis pitard</i>
៦៩	តាបូន “ តាបូន ”	<i>Carapa moluccensis</i>
៧០	តាមែម	
៧១	តាសែម “ តាសែន ”	<i>Xanthophyllum glaucum</i>
៧២	តាស្យាវ	<i>Phyllanthus Sp</i>
៧៣	តាអាត	<i>Oncosperma</i>
៧៤	ត្រូវ	<i>Terminalia cambodiana</i>
៧៥	ត្រពុន	<i>Ipomoea aquatica</i>
៧៦	ត្រកៅក្រាវ	<i>Acanthus ilicifolius (L)</i>
៧៧	ត្រសោក	
៧៨	ត្រសក់	
៧៩	ត្រាវអណ្តូក	<i>Colocasia esculenta</i>
៨០	ត្រាវ	<i>Crateva andansonii or odorata</i>
៨១	ត្រក់មីក	<i>Xyris indica</i>
៨២	ត្រាវ	
៨៣	ត្រើមអណ្តូក	<i>Ixora cuneifolia, Var.varians</i>
៨៤	ត្រាវ	<i>Crataeva religiosa (Bl)</i>
៨៥	ត្រាវ	<i>Crataeva nurvata (Ham)</i>
៨៦	ត្រាវ	<i>Crataeva nurvala (Buch)</i>
៨៧	ត្រាវ	<i>Diospyros Sp</i>
៨៨	ត្រង់ប្រសេម	
៨៩	ត្រង់អាមូត ឬ ត្រង់ឈូត	<i>Albizia myriophylla</i>
៩០	ត្រាលស្យាតស្វា	<i>Uvaria rufa</i>
៩១	ត្រេងព្រៃ	<i>Vitex holpadenon</i>
៩២	ត្រុងករុះ	<i>Randia longifera (Benth)</i>

៩៣	ត្រេងព្រៃ ឬ ត្រេងព្រៃវៀ	<i>Bridelia cambodiana (Bl)</i>
៩៤	ត្រេងព្រៃ	<i>Bridelia ovata</i>
៩៥	បន្ទាញ ( បន្ទាញវាល ឬ មច្ចុបយក្ស )	<i>Mimosa pigra</i>
៩៦	បន្ទាញិត ឬ បាយរំលើប	<i>Acacia spiralis</i>
៩៧	បបួស	<i>Cynodon dactylon</i>
៩៨	បបាច	
៩៩	ប៊ុន “ ប៊ុន ”	<i>Phoenix paludosa (Roxb)</i>
១០០	បាក់រេង	<i>Gardenia philastreii</i>
១០១	បើស	<i>Hibiscus tiliaceus</i>
១០២	ប្រង ឬ ប្រង	<i>Acrostichum aureum (L)</i>
១០៣	ប្របូន “ តំបូប្រែក ”	<i>Carapa obovata (Keon)</i>
១០៤	ប្របូល ឬ ប្របូលមេ	<i>Croton caudatus</i>
១០៥	ប្របូលឈ្មោល	<i>Croton joufra</i>
១០៦	ប្របាច	
១០៧	ប្រេងព្រៃឈ្មោល	<i>Phyllanthus Sp</i>
១០៨	ប្រេងព្រៃវៀ	<i>Phyllanthus lasodiifolius</i>
១០៩	ប្រេងកំឡោល “ ឬ តំ ”	<i>Bruguiera caryophylloides</i>
១១០	ប្រេងកំឡើ “ ឬ តូច ”	<i>Bruguiera gymnorhiza (Lam)</i>
១១១	ប្រេងកំ ( ប្រេងកំព្រៃកោងកាង )	
១១២	ប្រេងព្រៃ	<i>Bambusa arundinacea</i>
១១៣	ប្រេង	<i>Mimusops ?</i>
១១៤	ប្រេង	
១១៥	ប្រេងមីក	<i>Calamus Sp</i>
១១៦	ប្រេង	<i>Stenochlaena palustris</i>
១១៧	ប្រេង	<i>Diospyros bejaudii</i>
១១៨	ប្រេងអានមីមាត់	<i>Nymphaea lotus</i>
១១៩	ប្រេងមូង	<i>Nymphaea stelata</i>
១២០	ប្រេងត្រៃ ( ប្រេងកំព្រៃកោងកាង )	<i>Hernandia</i>
១២១	ប្រេង	
១២២	ប្រេង	<i>Hymenocardia wallichii</i>
១២៣	ប្រេង	<i>Breynia rhamnoides</i>
១២៤	ប្រេង ឬ អានមីម	<i>Homalium brevidens</i>

១២៥	រទាំង ឬ កាទាំង	<i>Homalium griffithianum</i>
១២៦	រតាតឹក ឬ រតាត	<i>Calamus salifolius (Bece)</i>
១២៧	រំទង់	<i>Nymphaea nouchali</i>
១២៨	រំរេញផ្កា	<i>Elaeocarpus madopetalus</i>
១២៩	រំរេញទឹក	<i>Elaeocarpus Sp</i>
១៣០	រំរេញត្នូត	<i>Elaeocarpus griffithii</i>
១៣១	រុក្ខតាតិស្វាត ( មុះចុងព្រៃពោឃាង )	<i>Scaevita</i>
១៣២	រុន	<i>Schumannianthus dichotomus</i>
១៣៣	រាំងទឹក ( រាំងភ្លើង )	<i>Barringtonia acutangula</i>
១៣៤	រាំងទឹក ( រាំងតាយ )	<i>Barringtonia micrantha</i>
១៣៥	រំទឹក	<i>Homonoia riparia</i>
១៣៦	លាមកចុះ	<i>Fluggea microcarpa (Bl) or Fluggea virosa(Roxb ex Willd )Baill</i>
១៣៧	ល្វា	<i>Ficus hispida</i>
១៣៨	ល្វៀង	<i>Cratoxylum cochinchinense</i>
១៣៩	រំលីងកណ្តុរ	<i>Euphorbia hirta</i>
១៤០	រំលីងដូង	<i>Calycopteris floribunda</i>
១៤១	រំលីងចុយ	<i>Parameria glandulifera or Streptocaulon juvenos</i>
១៤២	រំលីងប្រេះ	<i>Quisqualis densiflora</i>
១៤៣	រំលីងក្រី	<i>Ichnocarpus frutescens (L)</i>
១៤៤	រំលីងត្រីមិត	<i>Cayratia trifolia</i>
១៤៥	រំលីងត្រស់	<i>Combretum trifoliatum (Vent)</i>
១៤៦	រំលីងតាដើក	<i>Merremia hederacea (Burm f.)</i>
១៤៧	រំលីងប្រេង	<i>Derris trifolia</i>
១៤៨	រំលីងណ្តាតក្រចូត	<i>Anisicia martinicensis</i>
១៤៩	សណ្តាន់	<i>Garcinia loureiri</i>
១៥០	សម្ប៉ា	<i>Uncaria homomalla</i>
១៥១	សន្តែ	
១៥២	ស្នួលដី	<i>Nymphoides indica</i>
១៥៣	ស្នួលអំពោះ	<i>Nymphoides hydrophylla</i>
១៥៤	ស្នី	<i>Crudia chrysantha</i>
១៥៥	ស្នួត	<i>Ficus heterophylla</i>
១៥៦	សារាយសាប	<i>Utricularia aurea</i>

១៥៧	សារាយតូ	<i>Hydrilla verticillata</i>
១៥៨	ស្នាប្រៃ ( មុះចុងព្រៃពោឃាង )	
១៥៩	ស្នាបតបំ	
១៦០	ស្នាបតា	<i>Cammelina salicifolia</i>
១៦១	ស្នាបំ “ ក្រុមមាត ” ( មុះចុងព្រៃពោឃាង )	<i>Malaleuca leucadendrom</i>
១៦២	ស្នាបំក្រុមមាត ( មុះចុងព្រៃពោឃាង )	<i>Eugenia zeylamica</i>
១៦៣	ស្នាបំទឹក	<i>Grewia sinuala</i>
១៦៤	សំរឹបត	
១៦៥	សំរឹក	<i>Melanolepis vilifolia(Oktze) or Grewia urenaefolia(Gagnep)</i>
១៦៦	សេរា ស	<i>Lophopetalum fimbrialum</i>
១៦៧	សេរា ក្រុមមាត	<i>Cryptocarya oblongifolia</i>
១៦៨	ស្នា	<i>Sesbania javanica</i>
១៦៩	ស្នា ( មុះចុងព្រៃពោឃាង )	<i>Canavalis</i>
១៧០	ស្នា ( មុះចុងព្រៃពោឃាង )	<i>Ipomaea pescaprae</i>
១៧១	ស្នា ( មុះចុងព្រៃពោឃាង )	<i>Tribulus terrestris</i>
១៧២	ស្នាអង្កក់ទឹក ឬ ស្នាត្នក់ទឹក	
១៧៣	ស្នាអំពៅខ្សែប	
១៧៤	ស្នែ	<i>Ceriops roxburghians or Ceriops decandra</i>
១៧៥	ស្នែខ្មែរ	<i>Ceriops candolleana</i>
១៧៦	ស្នែខ្សែ “ ឆោទឹកសាប ឆោ គាតរៀ ”	<i>Avicennia officinallis</i>
១៧៧	ស្នែកក្របី	<i>Desmondium heterocarpon</i>
១៧៨	ស្នួលទឹក	<i>Dalbergia nigrescens</i>
១៧៩	សើក	
១៨០	អណ្តាបៀ	<i>Gmelina asiatica</i>
១៨១	អណ្តែង	
១៨២	អណ្តូង	
១៨៣	អំពា ( សំពា )	<i>Sonneratia alba or Sonneratia acida</i>
១៨៤	អំពុល	<i>Sonneratia griffithii</i>
១៨៥	អំពិលទឹកព្រៃ	<i>Cynometra “ Dongnaiensis ? ”</i>
១៨៦	អាររៀ ឬ ររៀ	<i>Schoutenia godefroyana</i>
១៨៧	អារក្រពើ ( អារក្រោះ )	<i>Stixis obtusifolia</i>

## Annex 2: List of existing biodiversity in Banteay Meanchey's floodplains

English Name	Scientific Name	Local name	Remark
<b>Fish</b>			
Marble goby	<i>Oxyeleotris marmorata</i>	ត្រីដំរី	
Wallago	<i>Wallago attu</i>	ត្រីសណ្តាយ	
Striped Snakehead	<i>Channa striata</i>	ត្រីវ៉ែស	
Asian redbtail catfish	<i>Hemibagrus nemarus</i>	ត្រីឆ្មាំង	
Siamese mud carp	<i>Cirrhinus siamensis</i>	ត្រីរៀល	
Spotted hampala barb	<i>Hampala dispar</i>	ត្រីខ្នុរ	
Gourami	<i>Trichogaster Microlepis</i>	ត្រីកំភ្លាញ	
Giant snakehead	<i>Cyclocheilichthys enoplos</i>	ត្រីឆ្មោ	
Climbing perch	<i>Anabas testudineus</i>	ត្រីក្រាញ់	
Peacock eel	<i>Macrogathus facus</i>	ត្រីឆ្មួញ	
Mekong silver barb	<i>Hypsibarbus pierrei</i>	ត្រីឆ្មិន	
Walking catfish	<i>Clarias batrachus</i>	ត្រីអណ្តែង	
Lesser bighead carb	<i>Thynnichthys Thynnoides</i>	ត្រីលិញ	
Dusky face carp	<i>Osteochilus lini</i>	ត្រីក្រុស	
Snail eating barb	<i>Puntioplites proctozysron</i>	ត្រីច្រកែង	
Trey Taoun	<i>Ompok eugeneiatus</i>	ត្រីតាអោន	
White-line catfish	<i>Mystus albolineatus</i>	ត្រីកញ្ចុះ	
Bronze featherback	<i>Notopterus notopterus</i>	ត្រីស្លាតិ	
<b>Turtle</b>			
Rice field Turtle	<i>Malayemys subtrijuga</i>	អណ្តើកស្រែ	
Yellow-headed temple turtle	<i>Heosemys annandalii</i>	អណ្តើកសកល	
Asiatic soft-shell turtle	<i>Amyda cartilaginea</i>	កន្ទាយ	
Black marsh turtle	<i>Siebenrockiella crassicollis</i>	អណ្តើកត្រីច	
<b>Bird</b>			
Purple heron	<i>Ardea purpurea</i>	ក្រសារប្រដេះ	
Sarus Crane	<i>Grus antigone</i>	គ្រាល	
Eurasian woodcock	<i>Scolopax rusticola</i>	ខ្វែក	
White-breasted waterhen	<i>Amaurornis phoenicurus</i>	មាន់ទឹក	
Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	ក្អែក	
Kong			
Toung	<i>Spot-billed pelican</i>	ទុង	
Oriental Darter	<i>Anhinga melanogaster</i>	ស្មៅញ	
Dom Dor			
Ktoum			
Black-backed Swamp hen	<i>Porphyrio indicus</i>	តូម	
Greater Adjutant	<i>Leptoptilos dubius</i>	ត្រងក់ធំ	
Painted Stork	<i>Mycteria leucocephala</i>	រោលពណ៌	
<b>Wood duck</b>	<i>Aix sponsa</i>	ទាព្រៃ	
Lesser whistling duck	<i>Dendrocygna javanica</i>	ប្រកែក	

Snake			
Posh Trey	Homalopsis buccata		
Posh Trey Rosh			
Posh Prolet	Enhydriis		
Bocouti Posh Kachan			
Posh Pha Ok			
Bocouti (Posh Channa Mom)			
Python	Papuan python	ពស់ប្ល្លាន់	
Tentacled snake	Erpeton tentaculatus		
Cobra		ពស់វែក	
Others			
White Monkey		ស្វាស	
Blake Monkey		ស្វាខ្មៅ	
Fox		កញ្ជ្រោង	
Otter		តើ	



Annex 3: Maps of flooded forest fire sites in Banteay Meanchey province

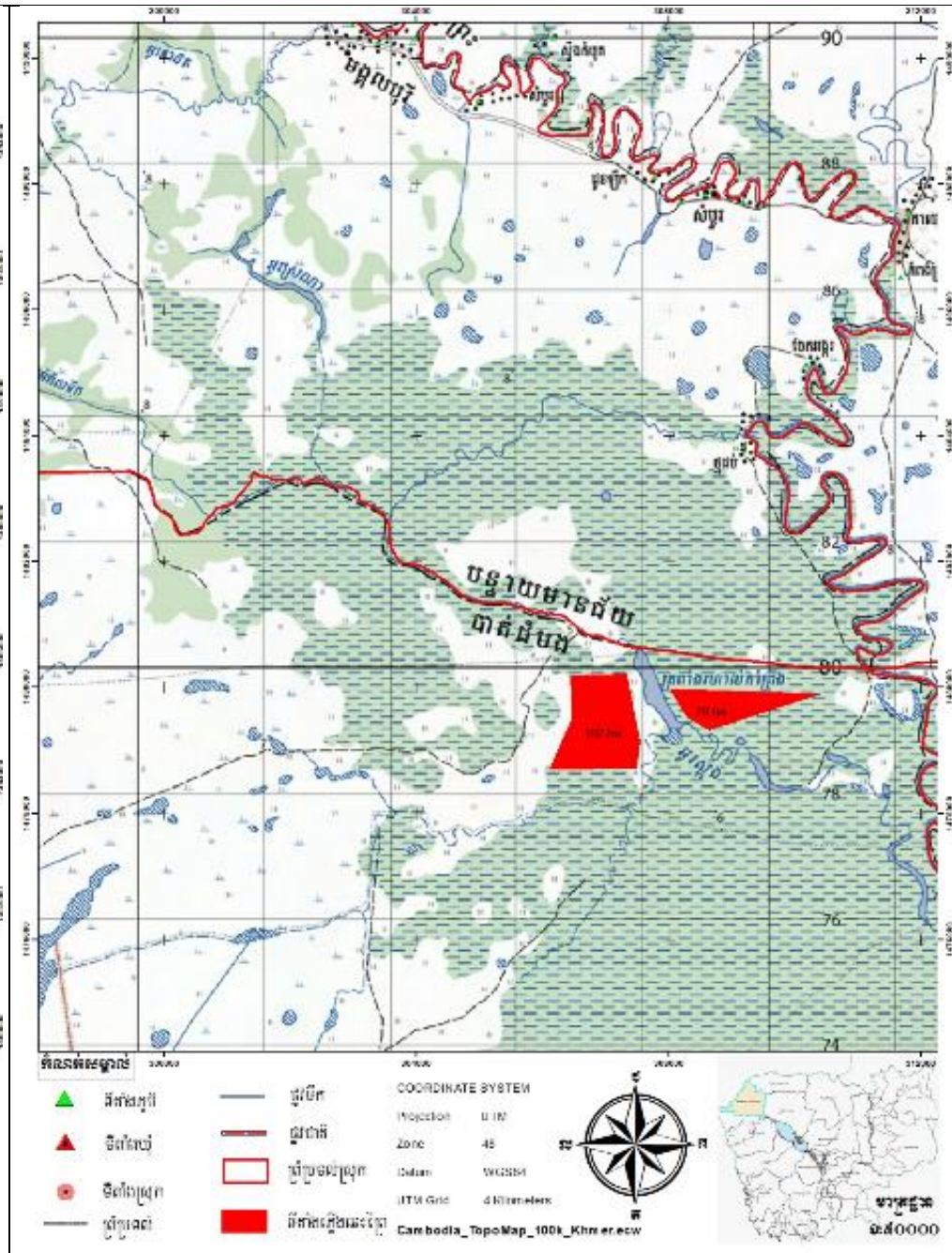
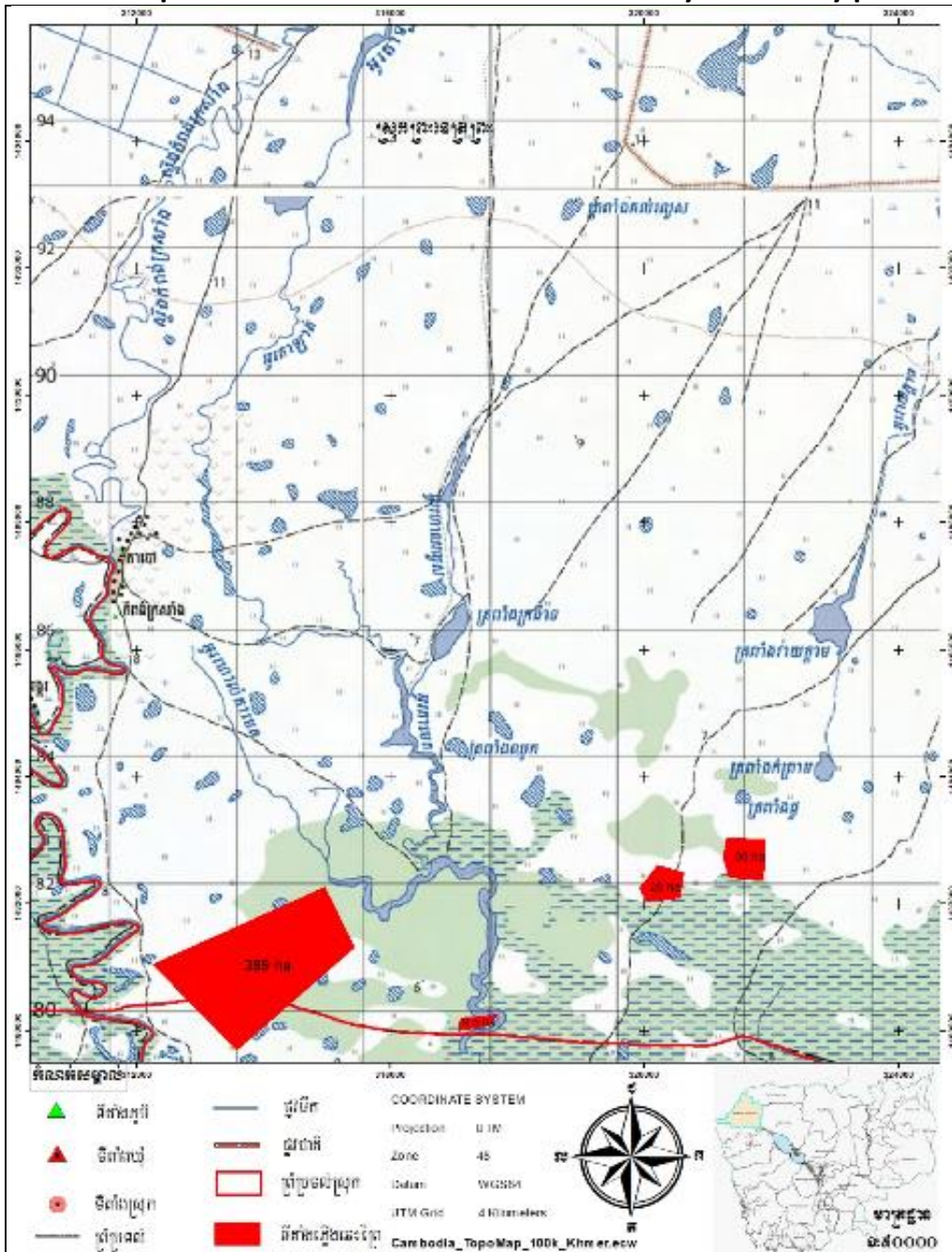


Figure 1: Flooded forest fire map in Preah Netr Preah district, BMC province

Figure 1: Flooded forest fire map in Preah Netr Preah district, BMC province





# កម្មវិធីជំរុញកំណើនវិស័យផលិតផលប្រកបដោយចីរភាព និងបរិយាប័ន្ន (ផ្នែកនេសាទ)

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**Fisheries Administration**

No. 186, Norodom Boulevard, Tonle Basac, Chamcar Mon, Phnom Penh, Cambodia, P.O. Box 582  
Tel: (855) 23 215 470 Facebook: <https://fia.maff.gov.kh/>