

**Mekong Integrated Water Resource Management Project  
(M-IWRMP)**

**INITIAL ENVIRONMENTAL AND SOCIAL EXAMINATION  
(IESE)**

**11 November 2010\_Final version**

## Preface

This report is intended to provide background information on environment and social conditions of the project areas and assess the potential impacts of the project based on the secondary data, review of the proposed activities, field visits to the proposed sites, meetings with concerned parties and local people, and expert opinion. It proposed measures to mitigate the potential negative impacts of the activities that could be identified before appraisal as well as prepared safeguard policy frameworks to be applied for all activities to be identified during the implementation of the project in Lao PDR and Cambodia. **Appendix 1** provides a brief background on the Lower Mekong Basin while **Appendix 2** provides a list of people met during the study. The environmental and social management framework (ESMF), a resettlement policy framework (CRPF), and an ethnic group development framework (EGDF) for Lao PDR is provided in **Appendix 3** while those (ESMF, RPF, IPDF) for Cambodia is provided in **Appendix 4**.

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## Executive Summary

1. *Background.* The Mekong River Commission (MRC), the Government of Lao PDR (GoL), the Government of Cambodia (GoC), and the World Bank (WB) are preparing a regional project for possible funding from the regional IDA. In line with the World Bank's safeguard policies, an initial assessment on potential environment and social impacts was undertaken by reviewing of secondary data, field visits to the project areas, and discussion with local authorities and local people, and the result is presented in this report.

2. *The Project.* The Mekong-Integrated Water Resources Management Project (M-IWRMP) is designed to establish key examples of integrated water resource management (IWRM) practices in the Lower Mekong Basin (LMB), at the regional, country and sub-national levels. The activities will be implemented in two phases over an 8 year period (2011-2018) using an Adaptive Program Loan (APL) instrument. This project is the first phase of activities (APL I) which is to be implemented over a six year period (2011-2016) through the following three components: (1) Regional Water Resources Management aiming to promote the regional IWRM cooperation on IWRM and trans-boundary issues, (2) National Water Resources Management designed to build technical and management capacity of the Water Resources and Environmental Agency (WREA) in Lao PDR, and (3) Improved Floodplain and Aquatic Resources Management in Regionally Significant Areas designed to help improve the management of floodplains and wetlands/fishing grounds. Main activities would include technical assistance; capacity building; small and medium size civil works related to upgrading, rehabilitation, and/or construction of irrigation schemes and/or community infrastructure; and fisheries/wetlands management, including livelihood development options. The project areas covers (a) the lower part of Xe Bang Fai (XBF) and Xe Bang Hian (XBH) in Lao PDR, (b) the lower part of Sekong River in Lao PDR, (c) the Mekong River in Lao-Cambodia border (Siphandon in Lao PDR and Stung Treng to Kratie in Cambodia); and (d) the transboundary "hotspots" along the Mekong and/or key tributaries which to be identified by the countries.

3. *Environmental and social background of the Mekong.* The Mekong River is one of the largest international rivers flowing through China's Yunnan Province, Myanmar, and the Lower Mekong Basins (LMB) comprising Lao PDR, Thailand, Cambodia, and Vietnam. Typical low (April-May) and high (August-September) flow volumes of the Mekong show a difference of the order of 15 times. This fluctuation is a defining characteristic of the environmental conditions and has a profound impact on resources management within the basin. The LMB has a number of precious natural resources of significant socio-economic, environmental and cultural value, and a large share of the population relies on the resources and services the river provides. About 85 percent of the total population in LMB lives in rural area (Landsat data 2007). Most live near rivers, lakes, and wetlands, with 25 million living within a 15 km corridor either side of the Mekong mainstream (Landsat data 2007). However, the distribution of population within this corridor varies considerably across national boundaries. Cambodia has the highest proportion of its national population living in this corridor (70 per cent), followed by Lao PDR (53 per cent), Viet Nam (16 per cent) and Thailand (4 per cent). There are number of ethnic minorities in the Mekong Basin in all LMB countries. Details on the Mekong and Lower Mekong Basin are provided in [\*Appendix 1\*](#) of this report.

4. *Environmental and social background of specific project areas:* XBF and XBH are located in the central part of Lao PDR (Khammouane and Savannakhet provinces) and the lower parts are subject to annual flood due to high water flow during wet season, and the Mekong backwater and the major land use are rice paddy and natural wetlands. Sekong River (Sekong and Attapeu provinces) and Siphandon (Champasak province) are located in the southern part of Lao PDR connecting to Cambodia while Stung Treng-Kratie (Stung Treng and Kratie provinces) are located in the northeastern part of Cambodia, and these areas are important for fisheries and wetlands conservation. The population of the project provinces in Lao PDR and Cambodia is ethnically heterogeneous, with almost 40 percent of the total population being made up of ethnic minorities. There are considerable population of Lao Tum (middle Lao), mainly ethnic Macon, found in the Xe Bang Fai floodplain, whereas majority of the population are Lao in the fishing villages in Champasak. In Stung Treng, there are 14 ethnic groups (9,093 people) currently living in the province and Kratie has 7 ethnic minority groups (36,476 people). More details are provided in Section III of this report.

5. *Potential impacts.* Overall impacts of the project would be positive institutionally. Improved cooperation among riparian countries, MRC secretariat, and wider stakeholders would forge effective implementation of IWRM in the lower Mekong in line with the 1995 MRC agreement which aimed at equitable and sustainable use of water resources. Updating water resource law and regulations and improved technical capacity on water quality and meteorology would strengthen WREA capacity to take the lead in water resources planning and integrated river basin management in Lao PDR where development in hydropower and mining is expected to be rapid. Improved cooperation of local stakeholders through the river basin organization mechanism and participatory planning process would improve responsiveness of government investment to the local needs and facilitate ownership and sustainability. The participatory planning process could also strengthen local community empowerment process, promote gender participation, and facilitate active cooperation with civil society and NGOs. There are existing Community Fisheries in most of the target-villages for both Lao PDR and Cambodia. The project will facilitate and ensure that empowering these groups on a more formal organization with equal participation in key aspects of the project, if not all, and the strengthening of village organizations, committees, production groups in the villages for the maintenance and monitoring of the facilities and subprojects. These efforts would also be positive for the protection and management of the Mekong Ramsar site in Cambodia.

6. The potential negative impacts were assessed focusing on the areas that could be identified before appraisal and the results and proposed mitigation measures are discussed in Section IV. No major environmental and social impacts are expected. Rehabilitation and construction of eligible small-scale irrigation schemes and its subsequent operation may result in some direct and indirect negative construction impacts. Good engineering practices will be applied during the execution of all the civil works by including specific safeguard requirements in the bidding document, informing the potential contractors of this obligation, and monitoring of the contractor's performance. UXO clearance will be ensured before project implementation. Impact on cultural property is not expected but a specific clause on "chance find" will be included in the bidding document. Rehabilitation of flood gates has been designed to allow for fish pass and the research facilities and resources will be provided to address the concern about depletion of indigenous species. The risks of increased pesticide usage will be small and the potential negative impacts will be reduced through prohibition of

procurement of large amount of pesticides using the “negative list” and training on integrated pest management and organic farming practices. Small private land acquisition and restriction of resources access due to strengthening of fisheries monitoring and enforcement may be required both in Lao PDR and Cambodia. To mitigate the potential negative impacts on restriction of resources (fisheries) access, the project has been designed to provide a livelihood development options (through a small grant scheme) with a participatory assessment and implementation approach, including capacity-building. The Indigenous peoples/Ethnic groups of Lao PDR and Cambodia would not be adversely affected by the project and successful implementation of the project would benefit them in a longer terms. The M-IWRM has been prepared through close consultation with local authorities and local communities giving particular attention to ensure that ethnic groups/indigenous peoples are well informed and have opportunity to voice their concerns.

7. *Resettlement Policy Framework (RPF/CRPF)*. Resettlement will not be required and this has been prohibited in the “negative list”. Implementation of *Component 3: Improved Floodplain and Aquatic Resources Management in Regionally Significant Areas* however may involve small private land acquisition and restriction of resources access due to strengthening of fisheries monitoring and enforcement. To mitigate the potential negative impacts on restriction of resources (fisheries) access, the project has been designed to provide livelihood development options (through a small grant scheme) with a participatory assessment and implementation approach, including capacity-building. To guide land acquisition and mitigation of resources access restriction, a Compensation and Resettlement Policy Framework (CRPF) has been developed for Lao PDR while a Resettlement Policy Framework (RPF) have been developed for Cambodia. The CRPF/RPF provides process and technical guidelines when land acquisition and/or restriction of resources access are involved.

8. *Indigenous People Development Framework (IPDF/EGDF)*. Indigenous peoples/Ethnic groups would not be adversely affected by the project and successful implementation of the project would benefit them in the longer term. The M-IWRM has been prepared through close consultation with local authorities and local communities giving particular attention to ensure that ethnic groups/indigenous peoples are well informed and have opportunity to voice their concerns. To guide the consultation and avoid adverse impacts on ethnic groups/indigenous people, an Ethnic Groups Development Framework (EGDF) has been developed for Lao PDR while an Indigenous People Development Framework (IPDF) has been developed for Cambodia. The IPDF/EGDF describes the objectives and approaches of consultation with ethnic groups/indigenous peoples. A separate report on consultation with ethnic groups in Lao PDR and Cambodia will be submitted separately.

9. *Environmental and Social Management Framework (ESMF)*. Given that there will be activities and locations to be identified during project implementation, although serious negative impacts are not expected, an Environmental and Social Management Framework (ESMF) has been developed to ensure that the potential negative impacts of the project activities to be identified are properly assessed and mitigated. The ESMFs have been designed to guide the implementation of safeguard activities of the project including connection with the IPDF/EGDF and RPF/CRPF. It comprises 4 main steps: checking for the “negative list” (activities that are non-eligible for project financing); screening criteria for potential negative impacts (simple checklist); safeguard documentations and clearance (as needed); and safeguard implementation, supervision, and monitoring. Technical guidelines

on good engineering practices, “chance find” clause, environmental mitigation measures for small infrastructure and irrigation scheme; and a simplified pest management plan are also included.

10. *Consultation and disclosure.* During the finalization of the IESE, the ESMFs, IPDF/EGDF, and RPF/CRPF were consulted with local authorities and local communities, especially the ethnic groups/indigenous peoples. This is to ensure that the local authorities, local communities and ethnic groups/indigenous peoples are well aware of the project, the potential impacts (positive and negative) and mitigation measures, and actively participate in the participatory planning process and monitoring during implementation. These instruments were prepared as a standalone document and they will be translated and disclosed in the countries.

11. *Implementation arrangement.* The project implementation units (PIUs) of each subcomponent will be responsible for implementation of safeguard measures under close supervision of the Project Management Unit (PMU) of WREA for Lao PDR activities and CMU of the Fisheries Administration (FiA) for Cambodia activities.

12. *Safeguard operation manual and training.* To facilitate effective implementation and monitoring of these safeguard measures, a safeguard operation manual (SOM) will be prepared and safeguard training will be conducted.

13. *Conclusion and recommendation:* This assessment indicates that the proposed M-IWRM activities are unlikely to result in any direct significant negative environmental and social impacts however measures have been developed to mitigate the potential minor impacts. Key measures include:

- Application of good engineering practices and monitoring of contractors performance, including UXO clearance;
- Application of EGDF/IPDF to ensure effective consultation with ethnic groups/indigenous peoples and avoid adverse impacts;
- Application of CRPF/RPF to guide land acquisition and avoid adverse impacts due to land acquisition and restriction of resources access;
- Application of the ESMF for all activities requires civil works, including screening for the ‘negative list’ and assessment of potential impacts; and
- Training on the application of the safeguard measures and manual prepared for the project;

14. Consultation with local authorities and communities suggested that the project is well accepted and they are willing to actively participation in the planning and implementation of the project activities. The scope of the proposed construction and rehabilitation works for the M-IWRM and its anticipated environmental and social impacts are of a magnitude which does not warrant further extensive studies.



## I. Introduction

1. *The Mekong.* The Mekong river flows through China's Yunnan Province, passes Myanmar, and runs through the Lower Mekong Basins (LMB) comprising Lao PDR, Thailand, Cambodia, and Vietnam. The Mekong basin as a whole, nearly 800,000 square kilometers (km<sup>2</sup>), spans a wide range of altitude, latitude, climate and vegetation zones along the 4,200 kilometers (km) length of the river. The LMB covers 77 percent of the entire basin area and account for more than four-fifths of the water that drains the basin each year. It covers more than 85 percent of Lao PDR and Cambodia territory, the whole northeastern part of Thailand, and part of the southern part of Vietnam. The entire area is under the influence of monsoon climate and thus marked by great seasonal variation in rainfall. Typical low (April-May) and high (August-September) flow volumes of the Mekong show a difference of the order of 15 times. This fluctuation is a defining characteristic of the environmental conditions and has a profound impact on resources management within the basin. The LMB has a number of precious natural resources of significant socio-economic, environmental and cultural value, and a large share of the population relies on the resources and services the river provides. The basin were strongly influenced by erosion and deposition and other climatic and river processes. The basin has high potential for hydropower development, especially in Lao PDR. More information on the Mekong and its development potential is provided in [\*Appendix 1\*](#).

2. About 85 percent of the total population in LMB lives in rural area (Landsat data 2007). Most live near rivers, lakes, and wetlands, with 25 million living within a 15 km corridor either side of the Mekong mainstream (Landsat data 2007). However, the distribution of population within this corridor varies considerably across national boundaries. Cambodia has the highest proportion of its national population living in this corridor (70 per cent), followed by Lao PDR (53 per cent), Viet Nam (16 per cent) and Thailand (4 per cent). There are number of ethnic minorities in the Mekong Basin in all LMB countries (see more details in [\*Appendix 1\*](#)).

3. *The project (M-IWRM).* The project area is located in the LMB and is designed to demonstrate ways to implement an integrated water resource management (IWRM) at regional, national, and local levels. Given the environmental and social sensitivity of the LMB and rapid development in the region, especially hydropower in Lao PDR, and the potential impacts on the water flows and the climate change, effective implementation of IWRM is considered necessary to forge effective use of water resources and facilitate sustainable development of the region. The Mekong River Commission (MRC) and the four riparian countries (Lao PDR, Thailand, Cambodia, and Vietnam) have adopted the IWRM concept and moving forward its implementation and more details are also given in [\*Appendix 1\*](#).

4. In this context, priority investments have been given to improve capacity of the country to: (a) implement the Mekong River Commission (MRC) procedures and processes, (b) improve meteorological and analytical capacity, (c) build floodplain management capacity in pilot areas, and (d) improve fisheries management in regionally significant areas. Given the different capacity and preparation process which will be required by the country to receive financing support from the World Bank, the project has been designed to be

implemented in 2 phases (over a 8-year period) using the World Bank's Adaptive Program Loan (APL) instrument. The first phase activities (APL I) will be implemented during 2011-2016 focusing on MRC related activities, IWRM activities in Lao PDR, and a fisheries management in Stung Treng-Kratie in Cambodia.

5. *World Bank Safeguard Policies.* This project is the APL I. Detailed activities are given in Section II while the environment and social background are given in Section III. The project has been classified according to the World Bank safeguard policies as "category B" and six policies are triggered: *Environmental Assessment (OP 4.01)*; *Natural Habitats (OP 4.04)*; *Pest Management (OP 4.09)*; *Indigenous Peoples (OP 4.10)*; *Involuntary Resettlement (OP 4.12)*; and *International Waterways (OP 7.50)*. Section IV describes the potential impacts and mitigation while Sections V and VI describe the safeguard training and implementation arrangement.

6. To comply with the World Bank's safeguard policies and move forward for appraisal of APL I, an Initial Environmental and Social Examination (IESE) was carried out to assess the potential impacts and prepare appropriate mitigation measures and the key findings are described in this report. Given that LMB is a complex system and IWRM is a process with a long term goal, the report also provides background information on the LMB and IWRM practices in the four countries. This is to facilitate a clear understanding of the reviewer as required by the World Bank.

## II. Project Description and Areas

7. *Objective.* The overall objective of the proposed APL is to establish key examples of IWRM practices in the LMB, at the regional, country and sub-national levels. In order to achieve this objective, the APL is designed to: (a) support implementation of tools for integrated water resource and natural disaster risk management, mainly floods and droughts in the LMB countries; (b) improve institutional capacity for integrated water resources management in selected countries, including strengthening hydromet systems; and (c) support improved floodplain management and management of aquatic resources for regional environmental benefits and the enhancement of rural livelihoods in pilot areas.

8. Specifically, APL I will support Lao PDR, Cambodia, and the MRC to provide an opportunity for the country to address trans-boundary issues while strengthening MRC's broader communication strategy; (b) supporting policy and institutional development for water resources management at both the national level and in key basins in the Lao PDR while upgrading the hydromet system; (c) supporting regionally significant aquatic resources and fisheries management in Lao PDR and Cambodia and wetland and floodplain management in Lao PDR.

9. The activities will be implemented through the following 3 components:

- ***Component 1: Regional Water Resources Management: (US\$7.1 million).*** The objective of this component is to promote IWRM at regional level through: (i) facilitating trans-boundary dialogue on critical water resources management issues among LMB countries to promote regionally-harmonized solutions (Subcomponent 1-1); (ii) establishing a regional approach on environmental and disaster risk assessment

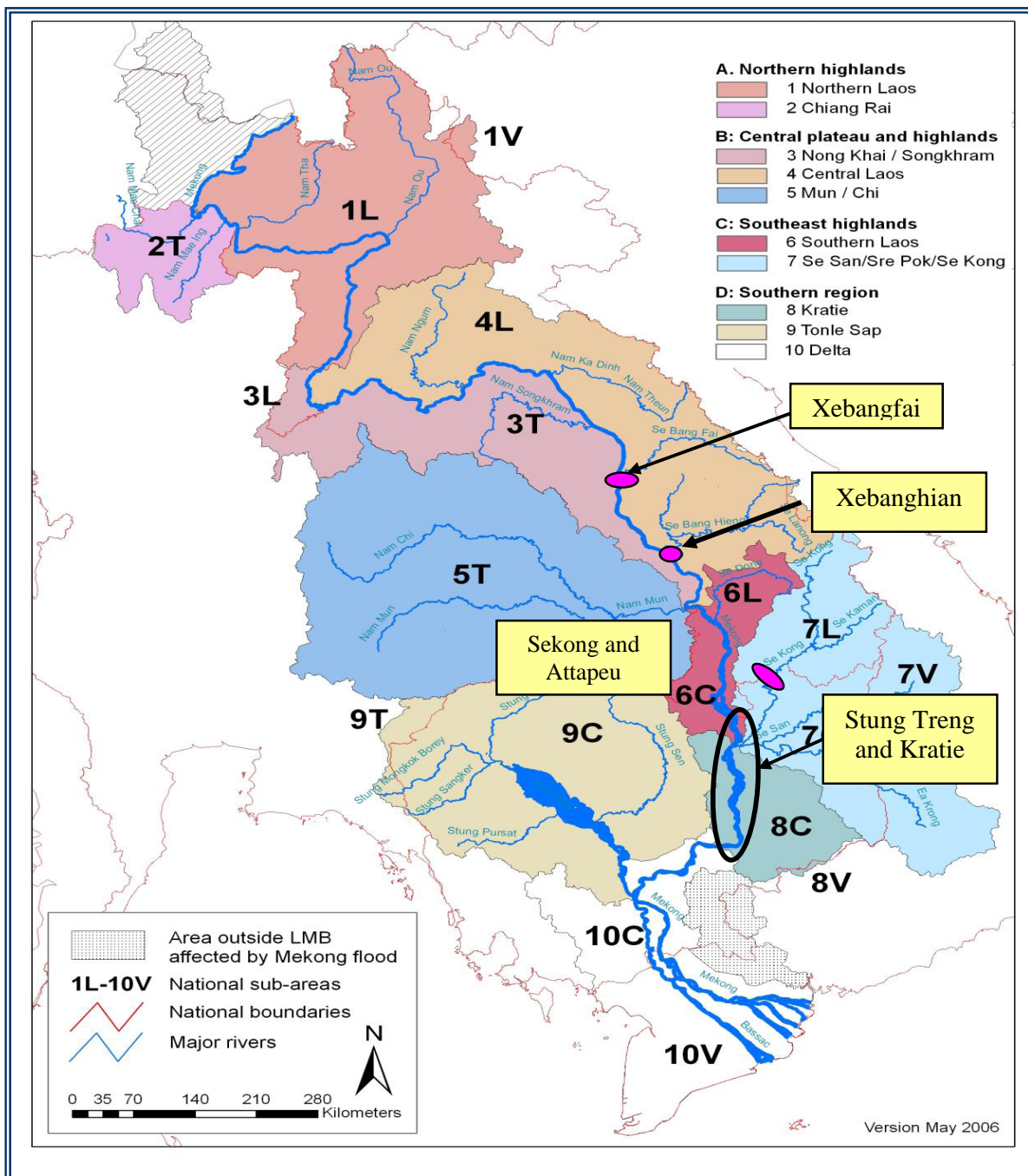
(Subcomponent 1-2); (iii) promoting understanding of regional IWRM principles to a broad range of stakeholders (Subcomponent 1-3); and (iv) facilitating implementation of the project activities at the national level, and supporting integration of the entire set of project activities under the Phase 1 APL Project. The Component would benefit all the LMB countries, including Lao PDR, Cambodia, Vietnam, and Thailand, and the IDA Regional Program would be used to finance the Component.

- ***Component 2: National Water Resources Management (US\$5.2 million).*** This component aims to support legal, institutional, and human resources strengthening to implement IWRM and better water resources planning in Lao PDR through: (i) development of a new Water Resources Law considering the regional enabling implementation of the IWRM in the Mekong River (Subcomponent 2-2); and (ii) installing essential institutional capacity regarding water quality monitoring (Subcomponent 2-2), hydro-metrological modelling (Subcomponent 2-3), collection and analysis of the hydro-metrological networks (Subcomponent 2-4); and support management of this component (Subcomponent 2-5). Lao PDR accounts for more than one third of the flow of the Mekong River; hence, strong and accountable systems at the national level are key to sound water management at regional level, specifically to: (i) regional harmonization of the underpinning legal framework for the IWRM; (ii) implementation of the procedures for water quality (PWQ), which were agreed among the LMB countries; (iii) better water resources infrastructure planning, considering upstream and downstream impacts; and (iv) sharing hydro-meteorological data with neighbouring countries and the MRC for integrated regional flood and drought forecasting.
- ***Component 3: Improved Floodplain and Aquatic Resources Management in Regionally Significant Wetlands and Water-bodies (US\$19.4 million).*** The component aims to contribute to establishment of a pilot common approach among the LMB countries for: (i) sustainable floodplain management, balancing livelihood support for local communities with enhancing regional ecological and biodiversity values in wetlands which are of basin-wise significance; and (ii) sustainable community fisheries co-management in key spawning and feeding habitats of regional significance. Two wetlands in the southern Lao PDR and important fishing grounds in the Lao PDR and the northern part of Cambodia have been selected as the project sites. The project activities will be implemented under the following subcomponents:
  - (3-1) *Management of River Basins and Floodplains in Xe Bang Fai and Xe Bang Hian Rivers* (US\$ 5.9 million to Lao PDR) through the following actions:
    - (3-1-1) support to development of river basin organizations and development of a floodplain management plan for the lower Xe Bang Fai (XBF) and Xe Bang Hian (XBH) rivers;
    - (3-1-2) rehabilitation of existing water resources infrastructure, mainly floodgates and village based small irrigation schemes covering 14,000 hectares in total to enhance environmental benefits (e.g. allowing fish passage, and increased water efficiency); and
    - (3-1-3) support for component management and administration including logistic support, office equipment, and incremental operating cost.

- (3-2) *Fisheries Management for Lao PDR (US\$4.7 million)*: This subcomponent would provide support for improved management of critical habitats for aquatic resources along the 200 km stretch of the mainstream Mekong between Champasak province (Lao PDR) and Kratie (Cambodia) as well as in the Sekong River, areas which have the richest fish spawning grounds. This subcomponent would support the following actions:
  - (3-2-1) fostering development of community-managed fisheries management organizations in Champasak, Attapeu, and Sekong Provinces in Lao PDR, including: (a) establishment of community-based fisheries management organizations; (b) development of participatory management plans; (c) demonstration of supplementary livelihood activities; and (d) providing support for local government capacity building and rural infrastructure;
  - (3-2-2) strengthening public sector fishery management, including: (a) fish catch data collection, monitoring and regulation; (b) supporting indigenous species aquaculture and stocking through rehabilitation/construction of small hatcheries at the provincial and district level; and (c) capacity building for assessing water resources infrastructure impacts on the fisheries; and
  - (3-2-3) facilitating component management and administration, including support for logistics, office equipment, and incremental operating costs.
- (3-3) *Fisheries Management for Cambodia (US\$8.8 million)*. This subcomponent would provide support for improved management of critical habitats for aquatic resources along the 200 km stretch of the mainstream Mekong between Champasak province (Lao PDR) and Kratie (Cambodia) as well as in the Sekong River, areas which have the richest fish spawning grounds. This subcomponent would support the following actions:
  - (3-3-1) fostering development of community-managed fisheries management organizations in Stung Treng and Kratie Provinces in Cambodia, including: (a) establishment of community-based fisheries management organizations; (b) development of participatory management plans; (c) demonstration of supplementary livelihood activities; and (d) providing support for local government capacity building and rural infrastructure;
  - (3-3-2) strengthening public sector fishery management, including: (a) fish catch data collection, monitoring and regulation; (b) supporting indigenous species aquaculture and stocking through rehabilitation/construction of small hatcheries at the provincial and district level; and (c) capacity building for assessing water resources infrastructure impacts on the fisheries; and
  - (3-2-3) facilitating component management and administration, including support for logistics, office equipment, and incremental operating costs.

10. The project areas include (a) the lower part of Xe Bang Fai (XBF) and Xe Bang Hian (XBH), (b) the lower part of Sekong River in Lao PDR, and (c) the Mekong River in Lao-Cambodia border (Siphandon in Lao PDR and Stung Treng to Kratie in Cambodia); and (d) the transboundary “hotspots” along the Mekong which to be identified by the countries. The XBF and XBH are located in the central part of Lao PDR covering Khammouane and Savannakhet provinces while Sekong and Siphandon are located in the south and is part of Sekong, Attapeu, and Champasak provinces. Stung Treng and Kratie are located in the northeast of Cambodia and is part of Stung Treng and Kratie provinces. *Figure 1* shows locations of the project areas while the environmental and social background of the areas is given in Section III.

**Figure 1: Locations of Project Areas in the Lower Mekong Basin**



### ***III. Environment and Social Background***

#### ***3.1 Xe Bang Fai River Basin (XBF)<sup>1</sup>***

11. *Location and floods pattern.* Located in the central part of the Lao PDR, covers an area of 10,345 km<sup>2</sup>, and comprises two provinces: Khammouane and Savannakhet. Mean annual rainfall across the basin is estimated at 2,600 millimeters (mm), resulting in a mean annual discharge of 494 cubic meter per second (m<sup>3</sup>/s), with mean maximum discharge being 3,422 m<sup>3</sup>/s, and peak floods of over 4,000 m<sup>3</sup>/s. The basin's population in 2005 was estimated at 231,000, most of which are engaged in agricultural production, fisheries and related livelihoods. Over the last decade, the area has been increasingly linked to regional markets and trade-routes, with a Mekong Mainstream Bridge currently under construction, connecting the basin to both Thailand and to Vietnam. During the dry season, the XBF carries little water, while most of the discharge (90%) occurs during the rainy season. Since the construction and start of operation of the Nam Theun 2 Hydropower Project (NT2), this hydrological balance is due to change, as downstream releases (on average 200 m<sup>3</sup>/s) of the NT2 dam are diverted into the XBF basin via an interbasin diversion and this will contribute to the alteration of the basin's hydrological regime. In addition, the downstream part of the XBF river basin is annually flooded, nurturing an extensive floodplain that provides refuge and habitat to many of the migratory fish species of the Mekong River Basin. As population gradually expanded into the floodplain of the XBF, these critically important habitats have increasingly been degraded. *Figure 2* shows location of XBF and its river system. The project area is located in the lowest part of the basin covering mostly in Nongbok and Xaibouly districts.

12. *Population.* According to the Nongbok District statistics, the population in 2006 was about 41,000 people with 7,600 households. Average household size was 5.41 persons and the average annual population growth rate during the period of 2001-2006 was 0.49 percent. Sex distribution was as 49 percent for male and 51 percent for female in almost all age groups except group more than 65 years old. Main occupation in the district is in agricultural production, fishery and working as hired labour in agriculture (68 percent of the population). 25 percent of the population works as hired labour in Thailand, particularly in factories. Very few people do business, trading or offer services

13. *Ethnicity.* Xe Bang Fai is mainly Lao (71 percent) and it is followed by Phouthyai (25 percent), Mangkong (3 percent) and King (1 percent). Most of household are headed by male occupying 95 percent of the total families in the district. The communities are culturally and linguistically homogenous. Households in Nongbok have, on average, 5.4 persons.

14. *Agriculture.* Nongbok district has 10,535 hectares (ha) of wet season rice of which 50 percent is for staple rice and the remainder for commercial rice. The dry season rice was only 1,880 ha under irrigation and 1,230 ha of non-rice crops on river bank slopes cultivated after rainy season using residual soil moisture and flood recession. The existing cropping intensity was 97 percent. There would be a potential for irrigation development in the area to increase cropped area in dry season. In Xaybouly district, where irrigation exists, wet season rice was 8,617 ha and dry irrigated rice was 8,520 ha. Beside rice cultivation in the low land, there

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<sup>1</sup> Integrated Flood Risk Management Plan for the Lower Xebang Fai Area in Lao PDR, Final report 2007

was 2,884 ha sugarcane on a highland, where flooding has no impact. The cropping intensity in the area was 165 percent. There would be no room for new irrigation development in the area except improving and/or modernizing existing irrigation schemes.

15. *Fishery.* Families in the lower reach of Xe Bangfai catch on average 168 kilogram per household per year (kg/HH/yr), sufficient for daily consumption and the production of 2 - 8 jars (about 22 kg) of 'Padek' per HH/yr. Padek, salted fermented fish, is the second staple food in Lao PDR, after rice. The remaining catch, on average 20 percent or some 35 kg/HH/yr, is sold on the market. Anecdotal information suggests that production has declined over the last 10-15 years. Average fish size and the number of species caught have also declined. According to the MRC-Technical Paper on fish yields, the data for typical yields of fish in paddy fields in Lao is limited. However, it is reasonable to expect that the fish yield in Lao would be lower than in the Cambodian and Vietnamese flood plains. The lower limits of natural fish in Cambodia and Vietnam were 55-80 kg/ha. The flood plain in Xe Bang Fai is under rainy seasonal paddy from June-October, with much shorter flooding duration compared to flood plains in Cambodia and Vietnam. It is estimated that the fish yield would be about 20 kg/ha, resulting in the value of 6 US\$/ha.

### 3.2 *Xe Bang Hian River Basin (XBH).*

16. *The Xe Bang Hian Basin* covers most of Savannakhet province, with an estimated basin population of 817,000 people, flowing from the Lao-Vietnam border to the Mekong. The river stretches over a length of 370 km, draining an area of 19,223 km<sup>2</sup>. Its main tributaries are the Sepone, Sethamouk and Sechamphone. Mean annual precipitation is 1,600 mm, contributing to a mean annual discharge of 538 m<sup>3</sup>/s, a mean maximum discharge of 4,097 m<sup>3</sup>/s and a peak flood of 8,500 m<sup>3</sup>/s. Like the XBF, the XBH provides one of Lao PDR's most important wetland areas, which provides a critically important habitat to the countries wildlife, including migratory fish. One of the first two Ramsar<sup>2</sup> sites (Xe Champhone Wetland) is located in this river basin (Box 1). Similar to other basins in central Lao PDR, the area has been subjected to increased regional integration and economic development during the last decade; the towns of Mukdahan (Thailand) and Savannakhet (Lao PDR) are now connected through the East-West Economic Corridor, with a bridge over the Mekong, and a road network from Thailand into Vietnam. *Figure 2* also shows location of the project area in the lower part of XBF and XBH.

17. *Ethnicity, agriculture, and fisheries.* Limited information on this aspect is available. However, given the location it is anticipated that the nature of ethnicity, agriculture, and fisheries practices in the lower XBH would be similar to those in the XBF discussed above. Like the XBF, the XBH provides one of Lao PDR's most important wetland areas, which provides a critically important habitat to the countries wildlife, including migratory fish. Similar to other basins in central Lao PDR, the area has been subjected to increased regional integration and economic development during the last decade; the towns of Mukdahan (Thailand) and Savannakhet (Lao PDR) are now connected through the East-West Economic Corridor, with a bridge over the Mekong, and a road network from Thailand into Vietnam.

<sup>2</sup> Ramsar is an international convention on Wetlands of International Importance, especially as a [Waterfowl Habitat](#), established in 1897 with an aim to promote conservation and sustainable utilization of [wetlands](#). At present there are 160 countries are the contract party covering a total area of nearly 186 million hectares (ha). Two Ramsar sites in Lao PDR (as registered on 28 September 2010) are Xe Champhone (12,400 ha) in Savannakhet province and Boueng Kiate Ngong (6,000 ha) in Champasak province.



**Area of Mekong Wetlands**

WETLANDS OF THE LOWER MEKONG BASIN

**Agricultural Use XBF/XBH**

**Project Area in XBF and XBH**

**Legend**

Land cover

- Forest
- Mangrove
- Plantations
- Other
- Inundated
- Grassland
- Bamboo
- Wood and shrubland
- Agricultural land
- Barren land
- Rocks
- Urban or built-over area
- Wetland
- No data
- Ocean

Roads

- Highway
- Main Road
- Other roads
- Railroad

Province boundary

District boundary

Country boundary

Major Cities

Major Flood Risk

- Stations
- Major Cities
- Country boundary
- District boundary
- Province boundary
- Flood risk area
- Basin boundary
- Urban area
- Permanent water body

Datum: INDIAN60 Projection: UTM48

Below provides a good description for the site (reference:.....)

“The Xe Champhone Wetland (12,400 ha; Savannakhet Province) is a large floodplain containing perennial rivers and a number of scattered lakes and ponds of different size. It is an outstanding example of a river with many meanders and oxbows, and also supports rice paddies and reservoirs, as well as swamp forests and freshwater marshes. Of the many lakes and ponds, some form habitat for the critically endangered Siamese crocodiles *Crocodylus siamensis*, and are home to several species of turtles. Historically, the deep pools are traditionally conserved because they usually have crocodiles and or have other spiritual purposes. The wetland provides important food, resources and livelihood for the approximately 20,000 people who live in and around the site. Thousands of cattle also use the area and the wetland becomes ever critical to both people and livestock during the dry season.



### 3.3 *Sekong River*

18. *Location and floods.* The Sekong River is an international tributary originating in Vietnam in the northeast and passing through Lao PDR and Cambodia before draining into the mainstream Mekong in Cambodia (see *Figure 3*). The Sekong Basin (28,815 ha) encompasses a small part of Viet Nam, southern Laos, and northern Cambodia. Most of the watershed includes all of Attapeu province and parts of neighboring provinces in both Lao PDR and Cambodia. Sixty percent of Attapeu is mountainous and seventy percent of the mountains are classified as ‘very steep’.

19. In Lao PDR, the Sekong River is one of the largest tributaries of the Mekong River and the basin comprises seven major tributaries: Xe Kaman, Xe Pian, Xe Khampho, Nam Kong, Xe Xou, Xe Namnoi, and Xe Katham. Samakkixay, Xaysetha and Sanamxay districts in Attapeu province are located in the lowland plains of the Sekong River valley and experience seasonal flooding with the arrival of the tropical monsoon and many parts of these districts often see water level increases of 8-10 meters during the wet season. In September 2009, the Sekong Basin suffered serious damages from Typhoon Kestana and the Government of Lao PDR is committed to provide reconstruction support and preparedness for the future.

20. *Fisheries.* Fisheries and wetlands of the Sekong watershed play an integral role in supporting local livelihoods as well as the development strategy of the provinces. The official records of capture fishery in the Sekong in 2006 were about 9,500 tons per year, with a value of about 17 million USD. Actual catches and values are probably much more than this, since official records do not measure subsistence catches, and valuation only considers the initial sale value of catch. Samakkixay, Xaysetha and Sanamxay districts were selected as the Lao demonstration site for the Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme which was implemented with Mekong Wetland Organizations support.

21. Fisheries and wetland products play a critical role in maintaining basic livelihoods of many of the residents of Attapeu province. Fishing brings in supplemental income as well as protein to rural households with access to wetland resources. Villagers fish year-round in wetlands, lakes and rivers. During the rainy season, fish can also be found in seasonal streams, flooded plains and rice fields. Discussions in Participatory Poverty Assessment villages revealed that fishing provides for up to 40 percent of some villagers’ livelihoods, though the catch itself is mediated by factors such as income, available labour, and the kind of gear used.

22. *Population and poverty.* Compared to other provinces, Sekong and Attapeu provinces are one of the least densely populated areas of Lao PDR. The provincial government estimates that about 66 percent of Sekong’s households are poor where GDP per capita is estimated to be at US\$ 120, way below the national average at US\$420, and majority of those living in Sekong experience rice shortages every year. Many rural communities have difficulty meeting subsistence needs, especially at the end of the dry season, when non-timber forest products (NTFPs) become an important component of diets. Moreover, the incidence of acute malnutrition and chronically energy deficient children is high in Sekong relative to other provinces in Lao PDR (UNDP 1997).

23. The UNDP National Vulnerability Report (2001) ranks two thirds of Attapeu as Most Vulnerable. The ‘rice bowl’ of Attapeu is the Sekong River valley, which flows through the middle of the province. Despite this being one the larger rice growing areas in the country, yield per hectare is extremely low by international standards. About 70-81 percent of the population of Attapeu aged 10 years and above is economically active. Profit from agricultural production in Attapeu was among the lowest in the country (between 2,500 - 5,000 Kip per household). Data for 2003-03 show that over half of this profit was from rice and livestock production. Income from fishing was third and from fruits and vegetables last. Livestock production in Attapeu is mostly buffalo (60%) and pigs (39%). Attapeu households have the highest number of animals per household in the country

24. In term of the incidence of poverty, in Attapeu, this figure has dropped markedly from 72 percent in 1992-93 to 45 percent in 1997-98. Women remain slightly less well off than men. While the aggregate figures show an overall decrease they do not reveal any information on changes in income disparities by district, ethnic group, gender or age. The aggregate figures indicate that the incidence of poverty is lower in the lowland districts than in the upland districts. However even in these districts 30 – 50 percent of households remain ‘poor’ by official criteria. The Fifth Five-Year Socio-economic Development Plan (2001-2005) lists 133 out of 208 villages as poor, and approximately half of the 17,650 households in Attapeu as poor.<sup>3</sup> This is extreme poverty. Recall that the population of the province is just over 100,000, which means 50,000 extremely poor people. In this context, people above a poverty line set at \$US1.50 per day could be called “well off”.

25. *Ethnic Groups.* There are several ethnic groups living in Attapeu, each with its distinctive language, culture and belief systems. Ethnically, Lao Tai (lowland Lao) make up only 38 percent of the population, and the remaining 62 percent are Mone-khmer (upland Lao), considered to be “ethnic minorities”. The highest concentration of lowland Lao are found in Samakkixay District around Attapeu town. The upland Lao in Attapeu include the Lave (Brau), Talieng, Oy, Alak, Tsou, Ngae and Cheng. Of the 13 ethnic groups identified in the province, 12 speak languages in the Mon-Khmer ethno-linguistic classification.

26. The Lave are the largest ethnic group in Attapeu. Along with the Tsou and Oy, they live mostly in the central plain in the districts of Samakkixay, Xaysetha and Sanamxay. The Talieng, Alak and Ngae groups reside in the more mountainous regions of Sanxay district and Pouvong district. It is not uncommon for people from three or more ethnic groups to live in the same village, often the result of fairly recent resettlement initiatives.

### 3.4 *Siphandon of Champasak, Lao PDR*

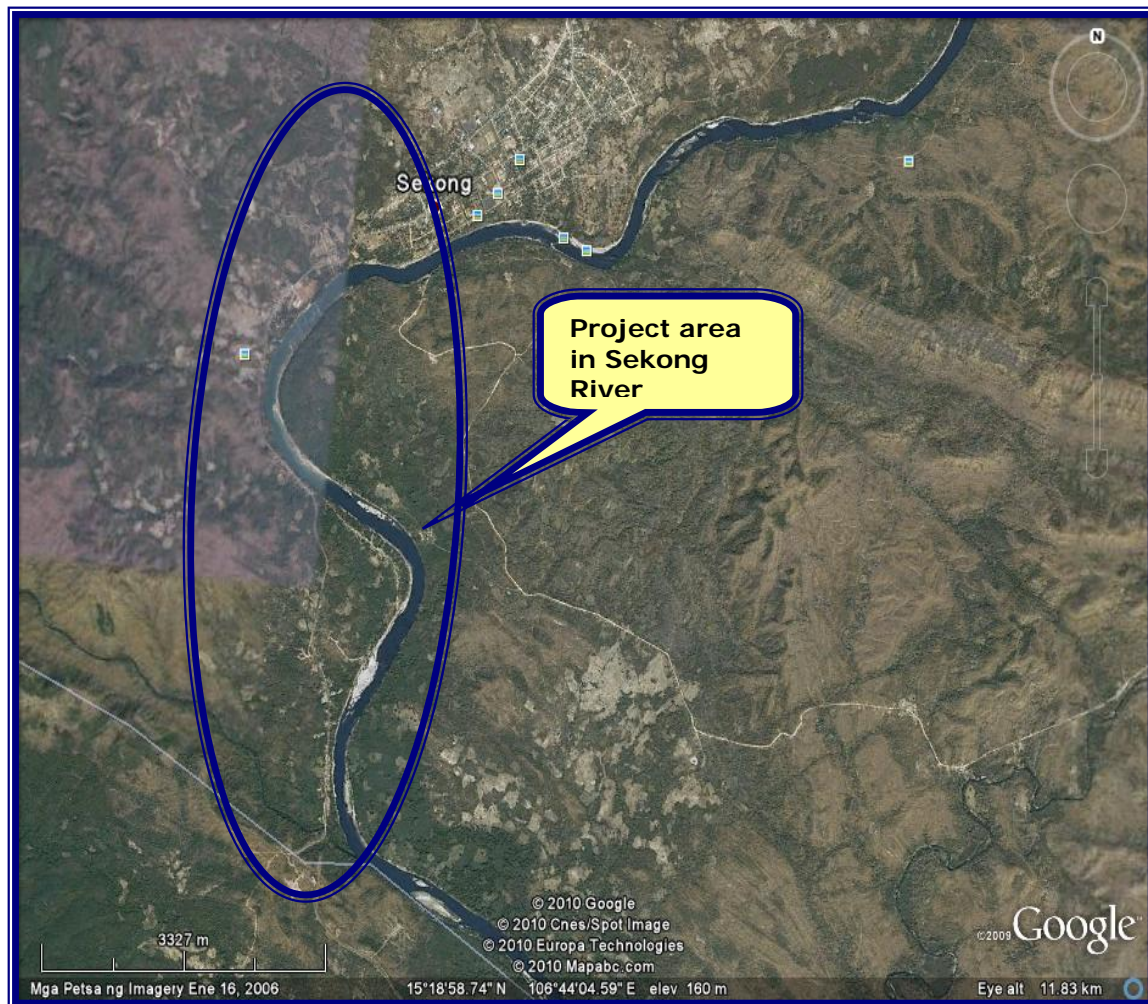
27. *Location and fisheries.* Siphandon is located on the Mekong mainstream in Champasak province which is located in the southern part of Lao PDR next to the Lao-Cambodia border. The area is a major wetland and very rich in fisheries resources, especially during wet season. Together with Stung Treng - Kratie and Tonle Sap of Cambodia, the area plays a major role in fish migration and the maintenance of biodiversity in the whole LMB. There are numerous spawning grounds, dry season refuges and migration routes for a significant amount of Mekong fish species. The total area stretches for about 338 km, including some 161 km in the Lao PDR and 177 km in Cambodia. Fishing in the area is

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<sup>3</sup> Action Aid and MWBP, PPA 7

mostly small-scale, conducted by rural households, and often considered a secondary livelihood activity. Unsustainable fishing practice are common in the project area: (a) the use of destructive methods and gears, (b) the exploitation of fish in sensitive areas (deep pool refugees, spawning grounds and migratory routes) and at sensitive times (spawning and migration periods), (c) local environmental disturbances (alterations of critical habitats, such as wetlands, inundated forests, rapids). In addition, fish resources are put under pressure by transboundary environmental impacts (infrastructure developments, chemical runoff from farming, hydropower generation and flood-control), loss of genetic diversity and the depletion of indigenous stocks (through effects from disturbances mentioned above, as well as the introduction of exotic fish species), and the wider economic developments in the area (including better access to markets and growth in tourism). There is an on- going effort to designate the Siphandon Area as a Ramsar site. The recently designated Ramsar site (Boueng Kiate Ngong) for Lao PDR is located in this area (Box 2).

*Figure 3: Location of Project Area in Sekong River Basin in Lao PDR*



28. *Population<sup>4</sup> and ethnicity.* The 1995 census (National Statistics Centre, 1995) counted over 65,000 people in Khong District and over 32,000 people in Mounlapamok District, settled in 131 and 65 villages respectively (Khong district, 1998). The two districts accounted for 19 percent of the entire population of Champasack province, and about 2 percent of the national population. An average annual growth of 2.4 percent between 1985 to 1995. The population belongs to the lowland Lao ethnic group.

29. Most of the 65,000 people who populate the district live on numerous islands in the middle of the Mekong, or along the river banks, and are highly dependent on wild-capture fisheries resources of food and income (Baird et al. 1998). Based on the rapid survey carried out in 14 villages of Khong district, Baird et al, (1998) reported that 94% of the families in Khong are involved in at least subsistence fishing and that the average family in Khong district caught 355 kg of fish ever a year or 62 kg per person. Approximately 91% of fish catches in Khong district comes from the mainstream Mekong River, with 5% coming from inundated rice paddy fields and natural depressions, and 4% from seasonal streams.

Box 2: description of Beung Kiat Ngong Ramsar site (effective 28 September 2010)

“The Beung Kiat Ngong Wetlands (6,000 ha; Champasak Province) is located in a large floodplain and is made up of two parts. The first supports a large freshwater marsh situated in a low depression and a peat land, which is the only one found in the Lao PDR. The second part support seasonal wetlands with a small number of scattered permanent ponds and paddy fields. The whole site becomes connected with neighboring rivers and streams during the wet season. The site is especially important for fish, which rely on the permanent wetlands for survival during the critical low water dry season. It is also important for fish spawning which takes place both inside the wetland, and during the wet season when some of the fishes migrate to upstream tributaries to spawn. Fish species identified from the site include walking catfish (*Clarias* spp.), snakeheads (*Channa striata*) and swamp eels (*Monopterus albus*), that can be harvested from throughout the site during the wet season. The wetland supports some 11,534 villagers who live in the site and who are primarily reliant for their income on wild-capture fisheries subsistence agriculture, and non-timber forest products.”

### 3.5 Stung Treng-Kratie of Cambodia

30. *Location and population.* Stung Treng and Kratie has a distance of 130 km with 40 islands located in the mainstream with 18 islands over 3 km long. Differing from other provinces in the south, the rivers in Stung Treng are upland rivers characterised by rocky beds and sandy islands. There are many large fish spawning grounds and many species and the area has been designated as a Ramsar site. There is a unique type of open forest growing on the sandy and rocky islands within the channels of the Mekong. These flooded open forests are a very rare habitat, occurring in very few places in Asia. The flooded forests, although open, provide a very structured environment and are important refuge areas at times of high water for young fishes. The area is a rich source of food for fish moving into the area to feed on fruits, leaves and detritus as well as for fish fed by the export of detritus downstream. As a diversified ecosystem, Stung Treng is believed to be a habitat for many fish species. It is a breeding ground and important habitat for a local fish species known as *Pa Se Y*, which is an endangered species not found in other provinces. In 1999, 37 km of the

<sup>4</sup> Siphandone Wetlands, 2001. Environmental Protection and Community Development in Siphandone Wetlands funded by the Commission of the European Communities.

area covering 6 km north of Stung Treng to 3 km south of Lao PDR-Cambodia border has been designated as a Ramsar site signified its ecological important (Box 3).

**Box 3: Stung Treng Ramsar Site Description** (reference: [www.mekongwetlands.org/.../Cambodia/description.htm](http://www.mekongwetlands.org/.../Cambodia/description.htm)):

The site was designated as a Ramsar site in 1999; the area covers a distance of 37 km along the Mekong River from 6 km north of Stung Treng town to 3 km south of the Lao boarder and encompasses the entire Mekong River, its islands and channels, to the terrestrial boundary 150 meters to the landward side of the riverbanks. In some areas the river is very broad with numerous channels between rocky and sandy islands. In others, the river forms a single channel with fast flowing current. Seasonal variation in water height is up to 10 meters. In the dry season rapids can be seen where bedrock is close to the surface. There are 10,000 people living within, or close to the site boundaries. This number is expected to increase with the improved security situation in this remote part of Cambodia. Three of the islands within the Ramsar site are permanently populated with established villages. In the dry season, larger islands are used for agriculture, harvesting of natural resource and hunting.

The area is considered a unique seasonally inundated riverine forest habitat and is considered as a globally significant wetland site. The forest is found in the flowing water on the edges of islands and rivers and on rocky outcrops and is important for the migration of over 100 species of fish between Lake Tonle Sap and the upper reaches of the Mekong above Khone Falls. The site and its immediate tributaries is also an important breeding site for fish species that cannot migrate beyond the Khone Falls and may be an important habitat for fish breeding and offer shelter for fish during period of peak flow. By law, commercial fishing lots are not allowed to operate in Stung Treng Province. The main habitats within the Stung Treng Ramsar site may be classified into four different types:

- **Riverine inundated forest** growing on the sandy and rocky islands comprising tree species identified tentatively as *Barringtonia* sp., *Eugenia* sp., and *Arcacia* sp. Visually strange, the trunks of these trees are mostly bent almost horizontal in the direction of the river flow with branches and leaves swept in the same direction (giving the appearance of being swept away). In some cases trees are supported by large buttress roots (1-2m. high) protruding downstream to support the trunks against the current. Many of the trees have reduced, narrow leaves reminiscent of rheophyllic trees and there are many epiphytes or parasites particularly of the fig *Ficus* sp.
- **River channels** run the length of the site. The bottom substrates include alluvial deposits, varying from fine mud to larger pebbles and stones. Bedrock occurs in some areas of swiftly flowing current. The depth of the river varies from very shallow to over 18 meters during the wet season. These channels are important for the migration of over 100 species of fish.
- **Deep pools** have been scoured by the swift currents in this section of the Mekong River. In the dry season these areas provide refuge for seasonally quiescent fish species and Irrawaddy dolphins. The invertebrate fauna of the walls of these pools is not known.
- **Sandbars** are common on stretches of the Mekong in Stung Treng. Submerged in the wet season, these areas provide dry season roosting and breeding habitats for sandbar nesting water birds.

31. Stung Treng is located 481 km from Phnom Penh in Cambodia's northeast. Its 12,016 km<sup>2</sup> is divided into five districts (Stung Treng, Thalaboriwat, Siem Bok, Se San and Siem Pang), 34 communes (several villages combined for administrative purposes), and 128 villages (Provincial Department of Land Management, Urbanisation, Construction and Land Title of Stung Treng, 2002). The Census of Cambodia 2008, shows that the province has 111,671 total population of whom 56,037 (50.18 percent) are women (average family size of 5.0 persons). The whole population of the province constitutes less than 1 percent (0.7%) of Cambodia's national population. The annual rate of population growth is 2.5 percent. The

population density is 7.5 persons/km<sup>2</sup> which is low compared to the national density average of 75 persons/km<sup>2</sup> (NIS, Census of Cambodia, 2008).

32. About 90 percent of the population of Stung Treng live along the rivers and streams and rely on fish for food security and livelihoods. Fish is the major source of protein and food security for people in Stung Treng. Some fish species spawn in Stung Treng and then migrate to the Great Lake before returning to spawn. Reducing the fish stock in Stung Treng also affects the stock in the Great Lake. Fresh fish production in Stung Treng accounts for about 0.2 percent of the national fresh water fish production. The Mekong River flows through Stung Treng province from north to south. In Stung Treng town, the Mekong meets the Sekong River, which has two more tributaries, the Se San and Sre Pok. On August 12, 2009, Cambodian government has signed a sub-decree under the country's Law on Fisheries that identifies 58 endangered aquatic animals including 29 freshwater fish, reptile and mammal species. The sub-decree spells out which freshwater and marine animals are banned from being transported or traded unless they are being farmed or are in compliance with the domestic fisheries law and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) which Cambodia ratified in 1997. The endangered freshwater species comprise 19 fish and 7 turtles as well as the Siamese crocodile (*Crocodylus siamensis*) and the Irrawaddy dolphin (*Orcaella brevirostris*). CITES considers 7 of the 29 freshwater species to be threatened with extinction including both the crocodile and the dolphin as well as giant fish species like the Mekong giant catfish (*Pangasianodon gigas*), Giant barb (*Catlocarpio siamensis*) and the Isok barb (*Probarbus jullieni*), also known as Jullien's barb. Other endangered freshwater species threatened with extinction under CITES are two fishes —the Asian bonytongue (*Scleropages formosus*) and the smalltooth sawfish (*Pristis microdon*) — and a turtle known as the mangrove or estuarine terrapin (*Batagur baska*). Endangered marine species identified by the sub-decree include a dozen marine mammals and half a dozen bivalves and gastropods. Also included are five species of turtles, three fish species, two horseshoe crabs and a crocodile as well as corals and sea anemones.

33. The Mekong River in Stung Treng is known in Cambodia as the 'Upper Mekong' which is why people identify themselves as *Nek Srok Lue* (uplanders) while people from the downstream Mekong are known as *Nek Srok Krom* (lowlanders).

34. *Ethnicity.* According to the report produced by the rural committee of Stung Treng in 1997, there are 14 ethnic groups currently living in the province. These ethnic groups include: Khmer (64,271), Laos (4,928), Kavet (2064), Kuoy (1588), Vietnamese (674), Chinese (458), Phnong (284), Lun (359), Brao (345), Kreung (210), Chams (85), Tum Puon (18), Kachock (14), and Jarai (5). In terms of ethnic relations, the Cambodian people in Stung Treng often refer to themselves as *Nek Srok Lue* (literally 'uplanders') which denotes people who inhabit the agricultural zone and who grow rice and cash crops for either their own consumption or for sale. Hill tribes or *Khmer Lue*, as they are collectively known, are concentrated in the mountainous regions of northeast Cambodia. There are also lowland Laos inhabitants here, as well as a number of Chinese and Vietnamese, who mainly live in population centres along the very few major roads. *Khmer Lue* people maintain their distinctive traditional way of life, as peasant farmers, as destroyers of forest or environment and illegal squatters (based on officials' points of view). In addition, these groups of people have been designated as marginal through a long and continuing history of political, economic, and social engagement with the lowlands. However, as development proceeds in northeast Cambodia, the traditional access to land, forest and natural resources in their communities are increasingly affecting the



ability of indigenous populations to secure their livelihoods and safeguard their identity and culture.

35. The other ethnic group is the Chams (*Khmer Islam*). They are mostly full-time fishers. They also live in the provincial town and number less than 50 households. They have been almost totally dependent on fishing for many generations and, as such, have developed a range of skills and knowledge better than the Cambodian fishers. Chams normally live separately from the Khmers either in land-based communities or on boats, but for the most part they have no land for agriculture. They are originally from Kompong Cham (central Cambodia) and Phnom Penh. From May to November, more Cham fishers arrive in Stung Treng province. They can be classified as nomadic in the sense that they live for fishing and travel great distances from place to place year round to do this. The Vietnamese are the final ethnic group involved with fishing in the province. They are relative newcomers, mostly arriving after the Vietnamese intervention in Cambodia in 1979. The ethnic Vietnamese mainly live along the riverbank by the confluence of the Sekong and Mekong next to the commercial port. In early 2003, the community consisted of 175 households with 45 families involved in farming snakehead fish and *Trey Kes* (glass catfish) at the confluence of the Sekong and Mekong rivers.

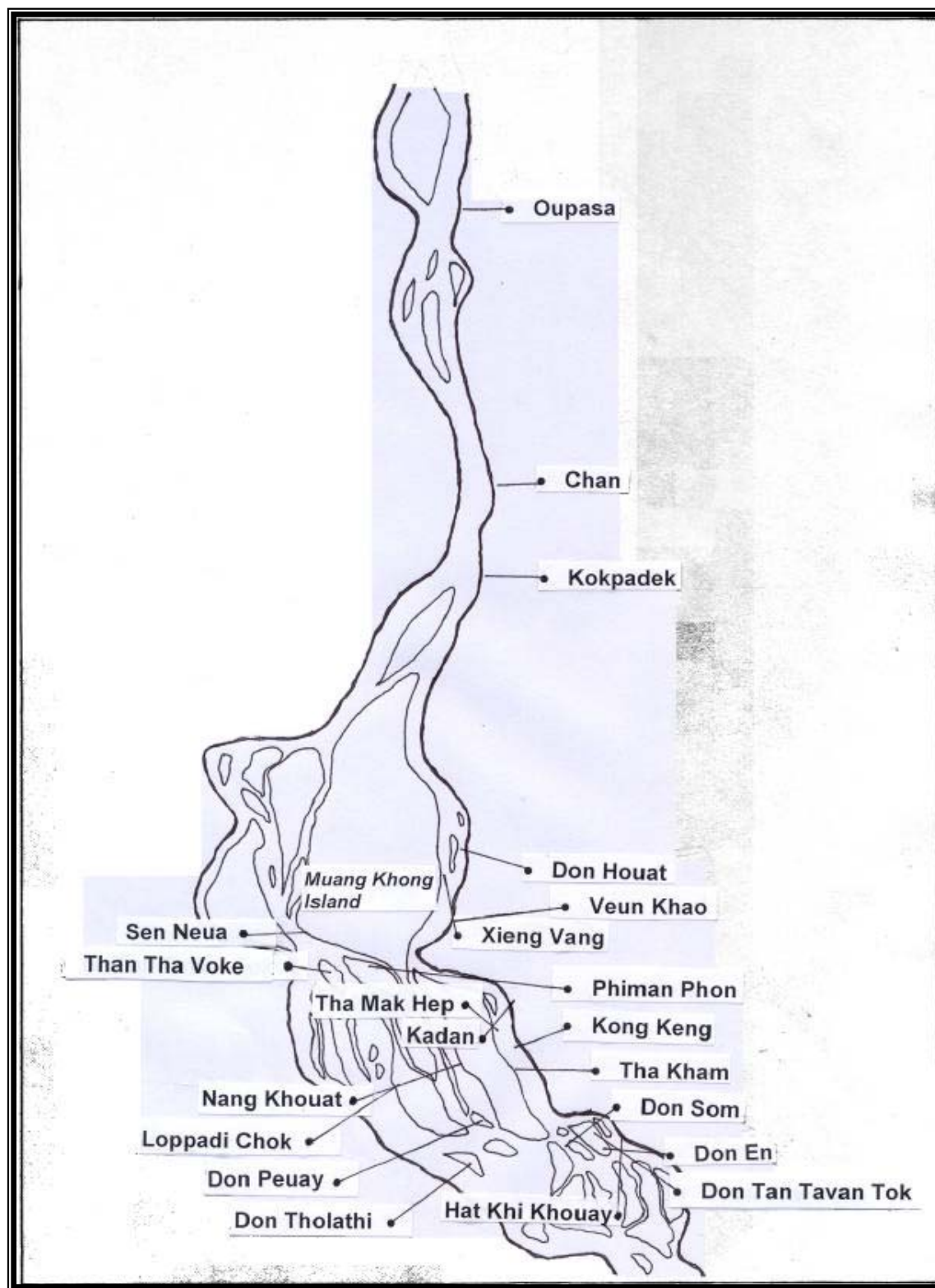
36. Kratie is located in the Northeast of Cambodia. It borders Stung Treng to the North, Monduliri to the East, Vietnam and Kampong Cham to the South and Kampong Thom to the West. The area of the province is 11094 square kilometers (MAFF [www.maff.gov.kh](http://www.maff.gov.kh)). The topography of Kratie is variable. The province is bisected North-South by the Mekong River and its narrow floodplains. Most of the province consists of undulating uplands, including lowland/ upland mosaic and upland forested areas. Kratie is classified as a rural province. (Figure 6: Location of the Project Areas in Kratie)

37. In 2008<sup>5</sup> the estimated population in Kratie was 319,217 persons and was 50 percent female. The population of children aged under 5 years was 38,409 which was 12 percent of the total province population. The Dependency Ratio (numbers of persons <15 years and 65 or over years per 100 adults aged 15-64 years) was 78. The total number of households in 2008 was 65,778, giving an average household size of 4.8 persons (NIS 2008). The people of Kratie live in 5 districts composed of 46 communes and 250 villages (CDB 2004). The population density of the province is 29 persons/km<sup>2</sup> compared to an average population density for Cambodia of 75 persons/km<sup>2</sup>.

38. In 2004 fully 40 percent of the wet season rice crop cultivated area in Kratie was destroyed, as a result of drought. Drought damage in the dry season, in fact reflects the failure of irrigation or flood recession systems to supply adequate crop water. The dry season crop area in this province is very small. In 2004 the wet season crop cultivated area was 75 percent of the total rice cultivated area for the year. Of this wet season cultivated area, 40 percent was destroyed, mostly drought damage. Further the dry season crop cultivated area was 25 percent of the total rice cultivated area for the year. Of this dry season cultivated area, 16% was destroyed, mostly drought damage, which reflects the failure of irrigation or flood recession systems to supply adequate crop water.

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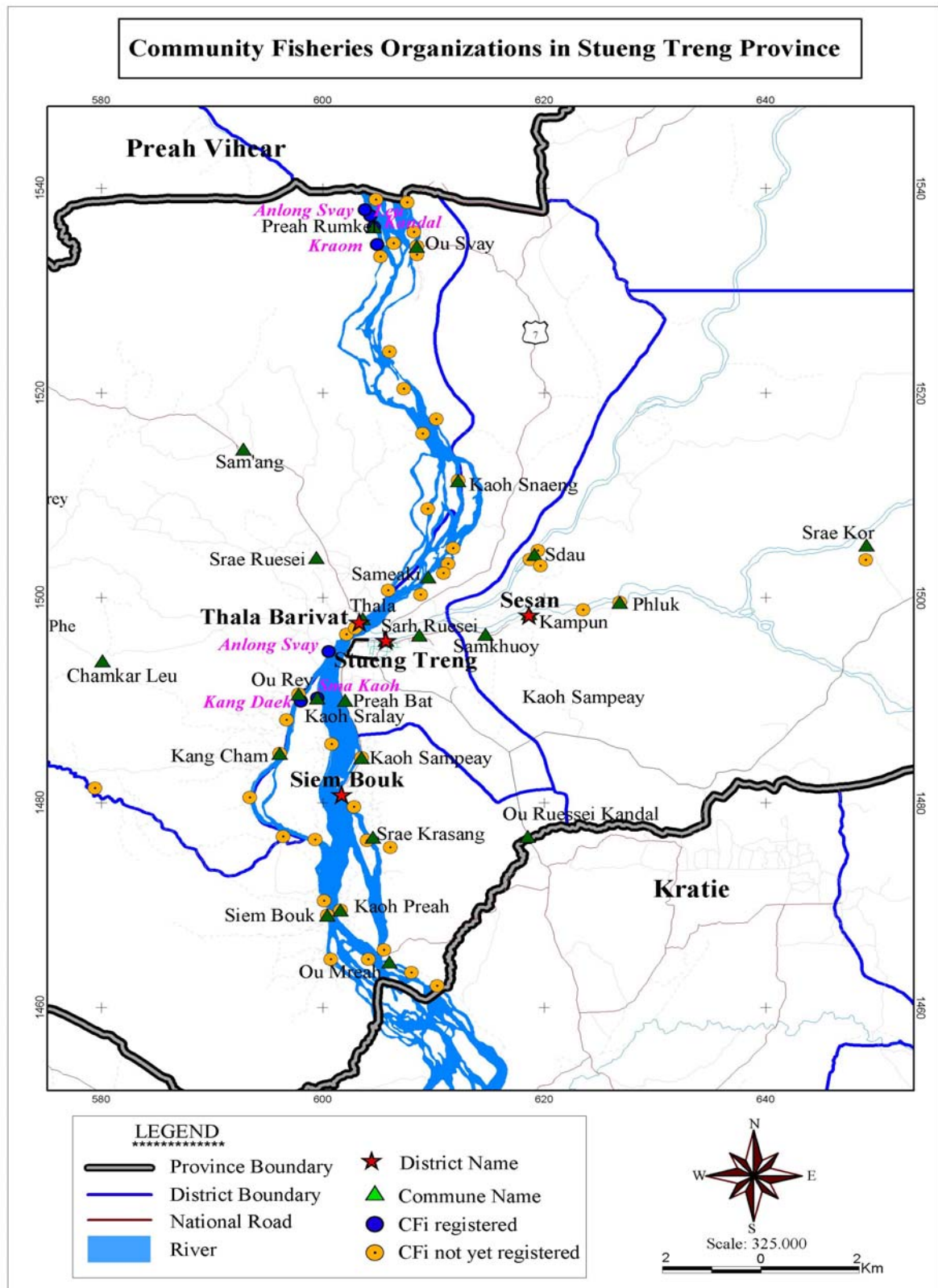
<sup>5</sup> Cambodia General Population Census 2008

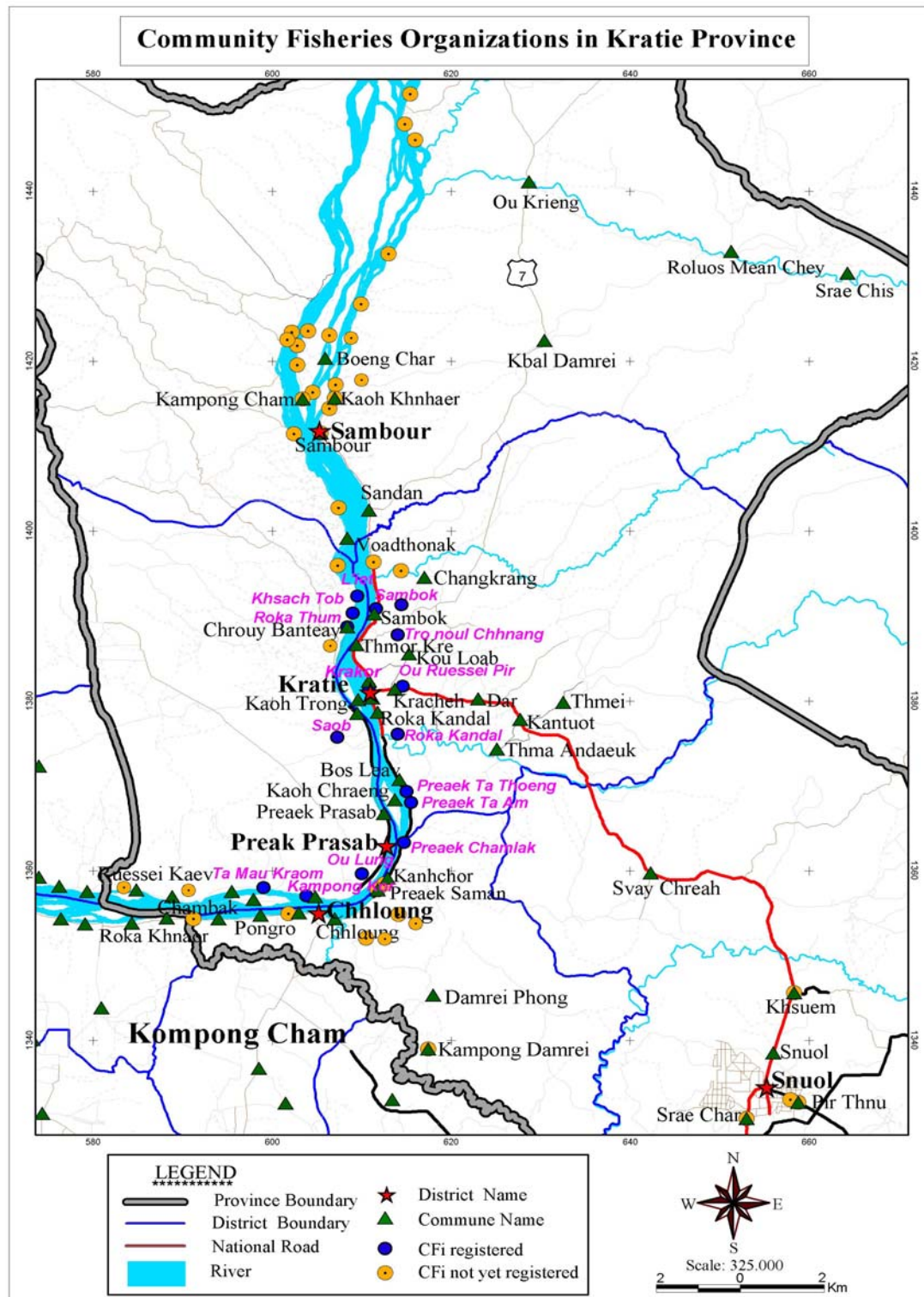


**Figure 4: Location of Project Area in Siphandon/Champasak Province in Lao PDR**



Figure 5: Location of Project Area in Stung Treng in Cambodia





**Figure 6: Location of Project Areas in Kratie in Cambodia**

## IV. Potential Impacts and Mitigation Measures

### 4.1 Methodology

40. The initial environment and social examination (IESE) was carried out from the period April 2010 to June 2010 and the assessment was made based on expert judgement and the following sources of data and/or application of various consultation tools (such as focus groups discussion, brainstorming, observations) during field visits as appropriate:

- *Secondary data:* Literature review of environmental and social background of the project areas, mostly available at MRC, Report from the World Bank; Asian Development Bank and other foreign funders; records and reports from government agencies, files maintained by the beneficiaries/users groups; documents and reports from foreign and local NGOs; and world wide web.
- *Focus group meetings* with key agencies and local authorities in the target areas (see list in [Appendix 2](#));
- *Field visits* to Xe Bang Fai, Xe Bang Hian, Champasak, and Sekong in Lao PDR and to Stung Treng and Kratie in Cambodia, including selective discussion with some representatives and observations during the visits (see details in [Appendix 2](#));
- *Specific consultation* on the project and draft safeguard instruments ([Appendixes 3 and 4](#)) with local authorities and communities, focusing on indigenous peoples/ethnic groups.

### 4.2 Environmental and Social Impacts Assessment

41. *Confirmation of safeguard triggered.* Field visits, discussion, and checklist confirms that the project activities would trigger six safeguard policies: *Environmental Assessment* (OP 4.01); *Natural Habitats* (OP 4.04); *Pest Management* (OP 4.09); *Indigenous Peoples* (OP 4.10); *Involuntary Resettlement* (OP 4.12); and *International Waterways* (OP 7.50). Although the Lao PDR and Cambodia are rich in historical and cultural sites, the rehabilitation/construction of the project activities is unlikely to have negative effects on any historical or cultural site due to project locations and the nature of small scale civil works which to be selected through active participation of local communities.

#### (a) Positive impacts and other benefits

42. *Improved cooperation among riparian countries, MRC secretariat, and wider stakeholders.* In view of the economic potentials of water resources development, especially on hydropower, and the combined value of capture fisheries and aquatic habitats and environmental services that wetlands provide, countries in the LMB have adopted the concept of IWRM and building their legal and institutional capacity to forge effective implementation. However, traditional decision making processes on water resources development have tended to favor large infrastructure development, with inadequate consideration to mitigate the potential negative impacts on local communities, water quality,

and ecosystems, especially those located downstream. IWRM principles explicitly incorporate a balancing of environmental, social and economic considerations and promote a participatory process among water users and other key stakeholders given due attention to local communities and women. Implementation of the Component 1 (MRC component) would strengthen cooperation among the riparian countries in addressing IWRM issues, especially those related to transboundary aspects in “hot spots” areas, as well as strengthen cooperation between MRC secretariat with the countries and other key stakeholders. Effective cooperation among these stakeholders in the basin development and planning process is the critical element of IWRM and achievement of sustainable development in the LMB. Implementation experience from this project could demonstrate ways to implement the IWRM concept at regional level.

43. *Strengthened IWRM capacity of Lao PDR.* Implementation of Component 2 would strengthen technical and management capacity of WREA of Lao PDR to take the lead in ensuring sustainable water resources development in Lao PDR. Updating the water law, strengthening capacity on flood forecasting, monitoring of water quality, and development of planning tool would improve national capacity to facilitate effective management of water resources in Lao PDR and this experience could be shared with other countries in the LMB.

44. *Improved cooperation at local level and improved livelihood development opportunities for local peoples.* Implementation of flood management and fisheries management (Component 3) would strengthen local cooperation which is critical for ensuring sustainable development in the LMB. The flood management subcomponent would promote community planning that would increase active participation of local authorities and communities, including women and indigenous peoples/ethnic groups, in water and water resource management for efficiency of water use and water resource allocation that would make the farmer-beneficiaries adaptive exposure to floods and drought. Planning and implementing communities infrastructure through a river basin organization (RBO) mechanism could increase the government capacity to be responsive to the local needs and people could be better protected against flooding. Shorter floods could increase food (rice) production and so food security while reduced flood risk could also reduce the contamination of shallow wells and increase sanitary conditions.

45. *Providing complimentary livelihood and food security.* Subsistence fishers require fishes for their families on a daily basis but increasing fishing pressure and illegal fishing could reduce availability of capture fishes and other aquatic animals. Many communities in the project areas had taken conservation measures in the past with assistance from international NGOs and experience suggested that community-based efforts are likely to provide sustainable fisheries for local communities. However, preventing destructive fishing methods and imposing fish size limits would cause a short-term decrease in catches, thus could decrease the daily food consumption in the shorter term. To mitigate this potential impact the project has been designed to provide support by way of promoting alternative means of obtaining fish or food for family consumption which is sustainable and adaptable for each community. Improved livelihood development opportunities and social capital discussed below would also positive impact on protection and management of the protected areas nearby, especially those designated as the Ramsar sites.

46. *Community empowerment and participation and transparency.* There are existing Community Fisheries in most of the target-villages for both Lao PDR and Cambodia. The

project will facilitate and ensure that empowering these groups on a more formal organization with equal participation in key aspects of the project, if not all, and the strengthening of village organizations, committees, production groups in the villages for the maintenance and monitoring of the facilities and subprojects. Continuous consultations and participation in meetings would be encouraged from project planning, implementation and monitoring and evaluation. These will focus on strengthening the village organizations to ensure transparency that they have a voice in decision-making processes, particularly in setting priorities.

47. *Kum Ban and Commune involvement.* The Government of Lao and Cambodia has identified the *Kum Ban and Commune* as the mechanism to strengthen coordination and participation between villages and districts. The decentralization provides for increased local responsibilities and ownership at the grassroots level as a means to enhance socio-economic development. Rural development activities should be planned and carried out at the lowest possible level of authority, starting with the village. In response to this, both governments has recently identified the *Kum Ban (Lao) and Commune (Cambodia)* as a coordinating level to facilitate interaction between the district (the most decentralized budget level) and local communities.

48. *Improved roles of civil society and NGOs.* The ethnic minority communities to be involved in the project are expected to benefit from investment and livelihood support activities. Past experience has shown that civil society and NGOs could play a constructive role in assisting local communities and ethnic groups/indigenous peoples in developing community-based activities in the areas of co-management focusing particularly on the development of village organizations such as Community Fisheries and structures which can represent the poor; women; ethnic minority groups and other vulnerable groups. They can also provide technical assistance in community organizing, project implementation and monitoring.

49. *Gender equality.* The project will ensure community ownership in all aspects of the project, this will be optimized if as many people as possible are allowed to contribute to the process of developing the *Kum Ban Development Plan* or *Commune Investment Plan*. This will require involving all groups, including women and men, to ensure the widest community participation and eventual ownership of the plan. The Government should commit to a gender development strategy for promoting women's social, economic, and political empowerment in the project. The gender strategy should aim to incorporate and strengthen role of women in all stages of project implementation: social mobilization and women's group formation, food security, access to credit and markets, vocational training, economic activities in producer groups, and project decision making. The project will ensure, in coordination with the Lao Women's Union (LWU) for Lao PDR and Ministry of Veteran and Women's Affairs (MVWA) for Cambodia that women participate in all aspects of project preparation and implementation. At the regional level, the MRC Gender Policy and Strategy aims at mainstreaming gender perspectives in all MRC development efforts.

50. *Critical Natural Habitats:* Implementation of Subcomponent 3-3 will involve The Mekong Ramsar site designated in Cambodia while other subcomponents (Subcomponent 1-1 and Subcomponent 3-2 may also involve important wetlands but the overall impacts will be positive. Special attention will be given to ensure that the activities in and/or nearby the Ramsar sites will be carried out with care and consistency with the management plan of the

sites and in close coordination with the agency responsible for managing the areas. The implementing unit will work closely with the agency responsible for managing the Ramsar site to enhance the synergy and complimentary efforts in line with the principles outlined in the World Bank safeguard policy and guidelines on natural habitats (OP 4.04). A clear process for planning and implementation in the Ramsar site will be developed as part of the safeguard operation manual.

***(b) Negative impacts and mitigation measures***

51. Despite the positive impacts discussed above, implementation of flood management and fisheries management (Component 3) may cause some negative impacts on local environment and local communities. Rehabilitation of the flood gates and/or construction and/or rehabilitation of small infrastructure may create direct and indirect damage to rice field and animals but these could be done through close consultation with the affected population and local communities to ensure that the proposed investment will be acceptable to local population. Land acquisition is not expected since the land required for construction of hatcheries and training facilities in Lao PDR and Cambodia are public lands and they are already available. Enforcement of fisheries regulations may cause adverse impacts on poor fishers in some project sites both in Lao PDR and Cambodia due to the restricted access to resources uses. This potential impact triggers the World Bank policy on involuntary resettlement (OP 4.12) and mitigation measures need to be developed and implemented.

52. *Tables 1-4* provide a summary of the potential negative impacts of the project activities identified before appraisal. The assessment was made based on the assumptions that (i) resettlement or demolition of buildings will not be involved, (ii) the proposed project activity would not include large scale infrastructure development, and (iii) the civil works would include (a) rehabilitation and development of small provincial hatcheries (around 2 hectares), and (b) rural infrastructure, mainly water wells, bridges, access roads, and rehabilitation of small irrigation schemes. Discussion on the potential negative impacts of key activities is highlighted below.

53. *Hatcheries.* The rehabilitation and development of small scale hatcheries at the provincial and district levels are proposed in Champasak (Khong District), Attapeu (Sanamsai District), and Sekong (Lamam District) in Lao PDR and Kratie and Stung Treng Provinces in Cambodia. The main objective of these hatcheries investments is to: (a) explore the potentials of the selected indigenous species for aquaculture, and (b) restocking key species. In general, the assessments found that the potential environmental impacts of the proposed hatcheries are not significant and can be mitigated sufficiently. The primary impacts would come from: (a) organic waste water from hatcheries and grow-out ponds, and (b) organic sedimentation (sludge) in the grow-out ponds. The proposed locations of the hatcheries are either existing locations or areas remote from the village settlements. In addition, these hatcheries are relatively small (less than 2 hectares), therefore no major impacts are expected to the human settlements. As the activities would target exclusively the indigenous species, there are no risks associated with the accidental introduction of new species into the wild, which may carry disease, unfavorable changes in the genetic pool, and competitive pressure on indigenous species.

54. Nevertheless, the project is designed to minimize these environmental risks associated with aquaculture as follows:

- The primary environmental risks associated with the hatcheries activities is from the organic wastes discharged from the hatchery into the nearby creeks, which could lead to the build-up of organic matter on the riverbed, causing eutrophication. To mitigate this risk, the project would first help construct a purification wetland in the hatchery area. The wetland or “pond” would function as a bio-filter, using specific plant and fish species that are able to utilize the organic waste from hatchery operations. In addition, the project would help explore possibilities of developing specially formulated fish food containing limited amounts of phosphorus, which would minimize the amount of phosphorus in the effluent discharged. A plan for regular monitoring of water quality is being developed, and technical assistance would be provided to hatchery staff for environmental management.
- There is no risk from the release of fingerlings or mature fish raised in the hatcheries back to nature. Usually there is a reluctance to release animals bred in captivity into wild populations because they may be genetically less vigorous or lack the imprint necessary to find their spawning grounds. This is not a concern in this case because fingerlings will come from wild parents that spawn in the area where the hatchery raised fish are being released. The project has been designed to provide support for indigenous species aquaculture and stocking. In Cambodia, small civil works would be conducted to (i) rehabilitate and renovate hatcheries in Stung Treng Province and (ii) construction of new hatchery in Kratie Province. Technical assistance will also be provided for farmer to farmer training and study tours to learn about indigenous species aquaculture. The hatcheries would serve fisheries communities in (i) restocking of key endangered species and (ii) piloting and promotion of indigenous aquaculture of key high-value indigenous species.

55. *Impacts due to civil works:* Implementation of small civil works for the: (a) rehabilitation of floodgates, located in the tributaries of the Xe Bang Fai ; (b) rehabilitation of village-based irrigation schemes; (c) rehabilitation/construction of small, province-level hatcheries; and (d) village-based rural infrastructure to support livelihood for the identified fishing communities. Visits to these sites confirmed that the potential negative impacts could be mitigated through application of good engineering practices and close supervision and monitoring. The implementing agencies for the civil works activities will include the specific good construction practices in the bidding and contract documents and ensure that the contractors are aware of this obligation. While *Physical Cultural Resources (OP. 4.11)* is not triggered, the contract will also include a specific clause on “*chance find*”. Large scale civil works or small/medium scale that likely to cause adverse impacts on local environment has been included in “*the negative list*”.

56. *Presence of UXO.* A preliminary screening will be needed to assess the presence of Unexploded Ordinances (UXOs). The Technical Guidelines and Procedures will be provided in this regard. The M-IWRM should seek advice from UXO Technical Groups and local communities and authorities during the subprojects’ technical feasibility study in order to determine the levels of contamination of the subproject sites. In the areas identified with no contamination, subproject activities and construction can proceed without having to undertake any UXO screening activities.



57. *Increased use of pesticides.* Increasing use of pesticides is not expected. Specifically, M-IWRM will address the risks of increased pesticide usage through: (i) the promotion of organic farming practices, and (ii) the application of a list of pesticides not acceptable under the M-IWRM as part of a simple Pest Management Plan. It is considered not justified for M-IWRM to introduce a comprehensive integrated pest management program because: (i) the irrigation schemes to be rehabilitated are very small; (ii) the usage of pesticides and fertilizers in both countries are low as compared to other countries; (iii) the project would also include the promotion of the System of Rice Intensification (SRI) to promote the less use of the agro-chemicals and saving irrigation water to some extent that would also have an increase in farmer's yield. The result of the SRI practice shows an 84 percent increase of the yield with an average yield of 7.2 ton/ha in SRI plot and that of 3.9 ton/ha in non-SRI plot. It was also confirmed that, (i) irrigation water can be saved 40 percent; (ii) inputs of fertilizer and pesticide can be reduced by 50 percent; and (iii) production cost can be reduced by more than 20 percent. Procurement of large amount of pesticide will not be allowed and this has been included in the "negative list".

58. *Potential negative impacts on Ramsar sites.* This is not expected. However, close coordination and consultation with the management agencies (the Department of Environment) both in Lao PDR and Cambodia will be maintained throughout the project.

59. *Resettlement Policy Framework (RPF/CRPF).* Resettlement will not be required and this has been prohibited in the "negative list". Implementation of Component 3 however may involve small private land acquisition and restriction of resources access due to strengthening of fisheries monitoring and enforcement. To mitigate the potential negative impacts on restriction of resources (fisheries) access, the project has been designed to provide a livelihood development options (through a small grant scheme) with a participatory assessment and implementation approach, including capacity-building. To guide land acquisition and mitigation of resources access restriction, a Compensation and Resettlement Policy Framework (CRPF) has been developed for Lao PDR and a Resettlement Policy Framework (RPF) have been developed for Cambodia. The CRPF/RPF provides process and technical guidelines when land acquisition and/or restriction of resources access are involved.

60. *Indigenous People Development Framework (IPDF/EGDF).* Indigenous peoples/Ethnic groups would not be adversely affected by the project and successful implementation of the project would benefit them in the longer term. The M-IWRM has been prepared through close consultation with local authorities and local communities giving particular attention to ensure that ethnic groups/indigenous peoples are well informed and have opportunity to voice their concerns. To guide the consultation and avoid adverse impacts on ethnic groups/indigenous people, an Ethnic Groups Development Framework (EGDF) has been developed for Lao PDR while an Indigenous People Development Framework (IPDF) has been developed for Cambodia. The EGDF/IPDF describes the objectives and approaches of consultation with ethnic groups/indigenous peoples. A report on consultation with ethnic groups in Lao PDR and Cambodia will be submitted separately.



## V. Environment and Social Management Framework (ESMF) and Consultation Framework

### 5.1 ESMF

61. *Environmental and Social Management Framework (ESMF)*. Given that there will be activities and locations to be identified during project implementation, although serious negative impacts are not expected, an ESMF has been developed to ensure that the potential negative impacts of the project activities to be identified are properly assessed and mitigated. The ESMF defines 4 main steps: (1) checking for the “negative list” (activities that are non-eligible for project financing); (2) screening criteria for potential negative impacts (simple checklist); (3) safeguard documentations and clearance (as needed); and (4) safeguard implementation, supervision, and monitoring. Technical guidelines on good engineering practices, “chance find” clause, environmental mitigation measures for small infrastructure and irrigation scheme and a simplified pest management plan are also included. Two ESMFs have been prepared (one for Lao PDR and one for Cambodia) as a standalone document in connection with the EGDF/IPDF and CRPF/RPF. [Appendix 3](#) presents the ESMF, EGDF, and CRPF for Lao PDR while [Appendix 4](#) presents the ESMF, IPDF, and RPF for Cambodia.

62. A safeguard operation manual (SOM) will be prepared and safeguard training will be conducted to facilitate effective implementation and monitoring of safeguard measures.

### 5.2 Consultation Framework

63. The community floodplain management and the fisheries co-management have adopted the principle of people participation process (PPP) during the preparation and design stage and this will be continued during implementation. A series of consultations have been carried out in January 2010 to confirm the interest of communities in the project, and feedback their opinions into the project design. During the pre-appraisal, further consultations were carried out to present the project activities plan, outcome of the environmental assessment, and expected role of the communities in the project. During finalization of the IESE, including ESMFs, EGDF/IPDF, and CRPF/RPF, another round of consultation was made both in Lao PDR and in Cambodia focusing on indigenous/ethnic groups. This is to ensure that the local authorities, local communities and ethnic groups/indigenous peoples are well aware of the project, the potential impacts (positive and negative) and mitigation measures, and actively participate in the participatory planning process and monitoring during implementation. Active *participatory process* would be continued during the implementation of the project to ensure that the local communities, especially the ethnic groups and women, in the project areas will not worse off and when possible benefit from the project. Active participation of mass organizations (LWU, LF) in Lao PDR, local and international NGOs in Cambodia, the private sector, and donors will be encouraged.

64. Preliminary consultation with the communities and local authorities suggested that the impacts could be mitigated through close consultation with local fishers and providing livelihood options as an complimentary income sources and/or providing other assistance that could avoid earning more money to buy the services (such as building a school or a clinic nearby community area). Detailed for the activities will be prepared through active

participation of the affected population prohibit during the implementation of the project. The project has therefore been designed to support the government and the communities in establishing and strengthening fishery co-management plans in Lao PDR. In Cambodia, village-based community fisheries (CFi) will be promoted and strengthened. Assistance from an international NGO which has been working in this area will be considered. A number of CFi were established many years ago but the lack of technical and financial support from the local government made it difficult for the poor communities to maintain these positive efforts. The community would also benefit from the research and training activities which would be included in the design of the fisheries subcomponent. Priority will be given to enhance active involvement of women of these communities to participate in the decision making process and implementation of activities.

## **VI. Implementation Arrangement and Safeguard Training**

### ***6.1 Implementation arrangement***

65. The proposed Phase I APL project activities will be implemented by the Lao PDR, Cambodia, and/or the MRC. In principle, the MRC will be responsible for implementing Component 1; Lao PDR will be responsible for implementing Component 2, Component 3-1, and Component 3-2; and Cambodia will be responsible for implementing Component 3-3. The MRC has assigned the MRC secretariat (MRCS) to assume responsibilities for implementing Component 1 in close cooperation with the countries, whereas Lao PDR and Cambodia have assigned the Water Resources and Environmental Administration (WREA) and the Fisheries Administration (FiA), respectively, as the national agencies are responsible for management and coordination (as the Project Management Unit or PMU) of the project activities to be carried out in the country. Implementation of subcomponent activities however will rest with the implementing agencies at national and/or local levels. *Figure 6* schematically present implementation structure of the project.

66. Implementation of safeguard activities, including proper record keeping, at subcomponents and/or activities level will be the responsibility of the Project Management Unit (PMU) as well as the Project Implementation Units (PIUs) of each subcomponent/activity. The PIUs will ensure compliance of safeguard when the activities are planned and implemented on the ground while the PMUs will be responsible for safeguards supervision and monitoring which should be made at least two times per year. PMUs will ensure that proper safeguard training will be provided to the PIUs staff and communities as needed.

### ***6.2 Safeguard training***

67. Training on safeguard principles and instruments such as the CRPF/PRF; EGDF/IPDF; ESMF and Safeguard Operations Manual will be provided to the project staff and key farmers during project implementation. This is to ensure that: (a) the proposed project activities will be properly screened through the ESMF; (b) a code of good engineering practice is included in the bidding documents and contracts and supervision and monitoring of the contractor performance is conducted by the supervision consultant; and (c) close consultation with local agencies and communities is carried out throughout project planning

and implementation. The project will provide safeguard training to the implementing agencies and at least one training before the project implementation and one training/year during the following 4 years. Below are the proposed trainings to be conducted prior and during project implementation:

- *Training on Environmental and Social Assessment, Appraisal and Management.* Stakeholders would require capacity building inputs to help them understand the social risks attached to different investments and the appropriate environmental and socials mitigating measures that can be taken to minimize impacts on the target-community and neighboring areas. In addition, they would require training to equip them with skills they can use to appraise sub-projects on key environmental and social criteria and ensure that they are environmentally and socially sound based on the ESMF that encourages in preparing strong monitoring and management plans.
- *Training on consultations and surveys* is important that all stakeholders have idea and knowledge on the importance in the processes linked to community participation, community mobilization, census surveys, baseline surveys, etc. Training on consultation processes for specific projects and exposure to various participatory methods of consultation can be imparted by consultants. The training should concentrate on inducing participation and transparency in project planning and implementation.
- *Training on Environmental and Social Impact Assessment.* To enable the understanding of the environmental and social risks attached to identified investments with corresponding appropriate measures that can be taken to mitigate adverse environment and social impacts on the community. This would not only enable them to prepare environmentally and socially sound investment but also
- *Training on Safeguard Policy, Resettlement and Rehabilitation.* Another very essential requirement for in addressing environmental and social safeguard issues during project implementation. Stakeholders, particularly the PMUs need to build capacity in this regard. This could include information on related laws and legislations, National and World Bank safeguard policies, methods of implementation, valuation of assets, grievance redressal, preparation and implementation of Environmental Management Plan (SMP)/ Ethnic Group Development Plan (EGDP) or Indigenous People Development Plan (IPDP)/Resettlement Action Plan (RAP) that may be encountered during project planning and implementation.
- *Training and Capacity Building for Gender Awareness and Participation.* A capacity building activities will be provided to women in various aspects. Trainings to support women members of village development committees (VDCs) by organizing women into separate groups to encourage participation in project activities and provide women's participation in village decision-making.

## VII. Conclusions and Recommendations

68. *Conclusions and recommendations:* This assessment indicates that the proposed M-IWRM activities are unlikely to result in any direct significant negative environmental impacts however measures have been developed to mitigate the potential minor impacts. Key measures include:

- Application of good engineering practices and monitoring of contractors performance, including UXO clearance;
- Application of EGDF/IPDF to ensure effective consultation with ethnic groups/indigenous peoples and avoid adverse impacts;
- Application of CRPF/RPF to guide land acquisition and avoid adverse impacts due to land acquisition and restriction of resources access;
- Application of the ESMF for all activities requires civil works, including screening for the 'negative list' and assessment of potential impacts; and
- Training on the application of the safeguard measures and manual prepared for the project;

68. From the preceding screening process, actual site visits, and analysis of potential environmental and social impacts, the IESE concludes that:

- The proposed M-IWRM and its anticipated activities are unlikely to result in any direct significant negative environmental and social impact.
- Application of good engineering practices will be applied to all civil works to reduce negative impacts.
- The proposed activities will all comply with the project 'negative list', which excludes subprojects that would have significant negative social or environmental impacts and violate any of the Lao PDR and Cambodia Laws and the World Bank Safeguard Policies.
- Direct negative potential impacts relate mostly to the civil works or construction phase, in which particular attention will be given to ensure that contractors comply with good engineering practice to be reflected in their contract agreement with M-IWRM to prevent any inconvenience to the public during construction phase.
- The scope of the proposed construction and rehabilitation works for the M-IWRM and its anticipated environmental and social impacts are of a magnitude which does not warrant further extensive studies.
- As part of the preparation process for infrastructure, all the activities/subprojects will undergo safeguard screening in accordance with the ESMF and the good engineering practices will be applied to mitigate the potential negative impacts due to civil works.

- Where indigenous peoples are involved the EGDF/IPDF will be applied to ensure effective consultation with ethnic groups/indigenous peoples and avoid adverse impacts;
- When land acquisition and/or restriction to resources access are involved CRPF/RPF will be applied to guide land acquisition and avoid adverse impacts due to land acquisition and restriction of resources access;
- Close cooperation with the key stakeholders at National and Provincial levels to ensure professional implementation and monitoring approaches
- Ample opportunities for project staff and local government to participate and benefit from training activities by allocation funds for safeguard training and compliance monitoring; and
- Close supervision by the World Bank to ensure compliance with the ESMF, RPF/CRPF, and IPDF/EGDF.

Table 1: Assessment summary of potential negative impacts of water resources and flood management activities in XBF and XBH in Lao PDR (Component 3.1)

Description of Activities	Potential Negative Impacts	Mitigation Measures	Responsible Agencies and Other Remarks
Rehabilitation of about 10 floodgates to benefit about 14,000 hectares. This will benefit local communities, including ethnic groups.	May block fish passages; May require small land acquisition; Would not involve any access restriction on natural resources; May create small impacts due to civil works.	Adoption of participatory planning process to facilitate close <b>consultation</b> with local communities, especially indigenous peoples /ethnic groups; The floodgates have been designed to allow for fisheries passage during fish migration; Good engineering practices to be included in bidding/contract documents and contractors performance will be monitored, and reported; The Compensation and Resettlement Policy Framework (CRPF) will be applied when land acquisition and/or donation are involved; Safeguard training will be provided.	Project implementation unit (PIU) of the Department of Irrigation (DOI) and the responsible provincial offices of the Ministry of Agriculture and Forestry (PAFOs/DAFOs) are responsible for safeguard implementation at component level.  Project Management Unit (PMU) of the Water Resources and Environment Administration (WREA) is responsible for supervision and monitoring.
Upgrading, rehabilitation, and/or construction of village-based infrastructure and/or irrigation schemes (about 5,800 hectares in XBF and 2,700 hectares in XBH). This will benefit local communities, including ethnic groups.	May require small land acquisition; May create small impacts due to civil works; May create more flooding in nearby areas and/or social conflict on water uses; May increase small use of chemical and pesticides.	CRPF will be applied when land acquisition and/or donation are involved; Good engineering practices to be included in bidding/contract documents and contractors performance will be monitored and reported; Close consultation among key stakeholders as part of the participatory planning process and River Basin Organization (RBO) operations would minimize potential impacts on nearby areas and conflicts among water users; Safeguard training will be provided.	

Table 2: Assessment summary of potential negative impacts of fisheries management activities in Lao PDR (Sekong, Champasak) –Component 3.2

Description of Activities	Potential Negative Impacts	Mitigation Measures	Responsible Agencies and Other Remarks
Operations, including upgrading, rehabilitation, and/or construction of hatcheries in Sekong, Attapeu, and Champasak. This will enhance public capacity to conserve local fisheries and assist local fishers.	May create small impacts due to civil works; May create water pollution and introduction of non-native species; Construction of a new hatchery in Attapeu will be built on public land.	Good engineering practices to be included in bidding/contract documents and contractors performance will be monitored and reported; The hatcheries have been designed to reduce potential impacts on water quality and on introduction of non-native species; If land acquisition and/or land donation is involved the CRPF will be applied; Safeguard training will be provided.	PIUs of the responsible provincial offices of the Ministry of Agriculture and Forestry (PAFOs/DAFOs) are responsible for safeguard implementation at subcomponent level.  PMU/WREA is responsible for supervision and monitoring.
Strengthening monitoring and enforcement of fisheries regulations in Sekong, Attapeu, and Champasak. This will benefit conservation of wetlands and fisheries.	May involve access restriction on natural resources.	Detailed assessment will be made to identify affected population in line with the principles describes in the CRPF; Participatory planning process will facilitate discussion among local authorities and communities and the issues will be discussed during the process.	
Support community fisheries, including development of community infrastructure and/or irrigation/livelihood development schemes. This will benefit local communities, including ethnic groups.	May create small impacts due to civil works; May require small land acquisition; May involve some restriction on natural resources access and/or create social conflict on fisheries and conservation areas; May increase small use of chemical and pesticides.	Good engineering practices to be included in bidding/contract documents and contractors performance will be monitored and reported; The affected population identified during the detail assessment will participate in the planning and/or decision making process for the alternative livelihood options and the process and agreement will be in line with the principles described in the CRPF and EGDF; Safeguard training will be provided including knowledge on the simple pest management plan and safe use of pesticides.	

Table 3: Assessment summary of potential negative impacts of fisheries management activities in Cambodia (Stung Treng-Kratie) –Component 3.3

Description of Activities	Potential Negative Impacts	Mitigation Measures	Responsible Agencies and Other Remarks
Operations, including upgrading, rehabilitation, and/or construction of hatcheries in Stung Treng and Kratie. This will enhance public capacity to conserve local fisheries and assist local fishers.	May create small impacts due to civil works; May create water pollution and introduction of nonnative species;	Good engineering practices to be included in bidding/contract documents and contractors performance will be monitored and reported; The hatcheries have been designed to reduce potential impacts on water quality and on introduction of non-native species; If land acquisition and/or land donation is involved the RPF will be applied; Safeguard training will be provided. Active participation of Ministry of Environment responsible for the Mekong Ramsar site will be ensured.	PIUs of Stung Treng and Kratie are responsible for safeguard implementation at subcomponent level.
Strengthening monitoring and enforcement of fisheries regulations in Stung Treng and Kratie. This will benefit conservation of wetlands and fisheries.	May involve access restriction on natural resources.	Detailed assessment will be made to identify affected population in line with the principles describes in the RPF; Participatory planning process will facilitate discussion among local authorities and communities and the issues will be discussed during the process.	PMU of the Fisheries Administration (FiA) is responsible for supervision and monitoring.
Support community fisheries, including development of community infrastructure and/or irrigation/livelihood development schemes. This will benefit local communities, including ethnic groups.	May create small impacts due to civil works; May require small land acquisition; May involve some restriction on natural resources access and/or create social conflict on fisheries and conservation areas; May increase small use of chemical and pesticides; May be in conflict with the Mekong Ramsar site policy/management.	Good engineering practices to be included in bidding/contract documents and contractors performance will be monitored and reported; The affected population identified during the detail assessment will participate in the planning and/or decision making process for the alternative livelihood options and the process and agreement will be in line with the principles described in the RPF and IPDF; Safeguard training will be provided including knowledge on the simple pest management plan and safe use of pesticides; Active participation of Ministry of Environment responsible for the Mekong Ramsar site will be ensured.	



Table 4: Assessment summary of potential negative impacts of the Lao PDR water resources management –Component 2

Description of Activities	Potential Negative Impacts	Mitigation Measures	Responsible Agencies and Other Remarks
Construction of water quality laboratory at the Water Resources and Environment Research Institute (WERI) of WREA	Impacts due to small civil works	Include good engineering practices in the bidding and contract documents and closely supervise/monitor contractor performance	PIU of WERI is responsible for ensuring compliance with safeguards under supervision of PMU/WREA
Construction of hydromet stations by the Department of Meteorological and Hydrology (DMH)	Impacts due to small civil works; Specific locations will have to be determined during the implementation; If areas is located in protected areas, impacts may include clearance of forest, illegal use of NTFP, wildlife hunting, borrow pits, etc.	Include good engineering practices in the bidding and contract document and close supervision and monitoring the contractor performance. If the station is located in protected/sensitive area, specific requirement will be given wildlife hunting	PIU of DMH is responsible for ensuring compliance with safeguards under supervision of MPU/WREA

Table 5. Assessment summary of potential negative impacts of the regional water resources management –Component 1

Description of Activities	Potential Negative Impacts	Mitigation Measures	Responsible Agencies and Other Remarks
Locations and issues (transboundary “hotspots”) will be identified through participatory planning process by the countries during the implementation; Likely issues may include flood/water resources management; wetland and/or fisheries; communities infrastructure	Locations and activities may involve ethnic groups / indigenous peoples;  Impacts would likely to be similar to those identified for Component 3.	Similar to those identified for component 3 above.	The countries responsible for the activities are responsible for ensuring compliance with safeguards under supervision of MRC

Figure 7: Implementation Arrangement

