

**KINGDOM OF CAMBODIA**

**NATION RELIGION KING**



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

**CAMBODIA: ENVIRONMENTAL  
AND SOCIAL MANAGEMENT  
FRAMEWORK (ESMF)**

15 October 2010

## PREFACE

This Environmental and Social Management Framework (ESMF) for Cambodia is designed on a basis of outcomes from the Initial Environmental and Social Examination (IESE). It will be applied to all investments to be financed by the World Bank for technical and/or financial support from the Mekong Integrated Water Resource Management (M-IWRM) Project.

The Project Management Unit (PMU) and the respective Project Implementation Units (PIUs) of the Fisheries Administration (FiA) of the Ministry of Agriculture, Forestry, and Fisheries (MAFF) are responsible for ensuring compliance with the ESMF, including keeping proper documentation in the project file for possible review by the World Bank.

This document is considered a living document and could be modified and changed in line with the changing situation or scope of the activities. Close consultation with the World Bank and clearance of the revised ESMF will be necessary.

# Mekong Integrated Water Resource Management (M-IWRM) Project

## **Cambodia: Environmental and Social Management Framework (ESMF)**

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## I. Introduction

1. The Environmental and Social Management Framework (ESMF) is developed based on the outcomes from the Initial Environmental and Social Examination (IESE) to minimize adverse environmental and social impacts that may occur due to the implementation of Mekong Integrated Water Resources Management (M-IWRM) Project (the Project) as required by the World Bank's safeguard policy on environmental assessment (OP4.01). The ESMF describes how safeguards issues will be dealt with by outlining (i) types of activities that will not be supported by the project using the "negative list"; (ii) steps of safeguard screening and assessment to identify potential safeguard issues (social and environment), including specific procedures and documentations and opportunity to enhance positive impacts; (iii) describes specific safeguards procedures and mitigation measures for activities that may create with environmental and/or social impacts; and (iv) outlining institutional and monitoring arrangements. Specific procedures and/or guidelines to mitigate potential environmental impacts are included as annexes to this ESMF while those related to social aspect as required by the World Bank's safeguard policy on indigenous peoples (OP4.12) and involuntary resettlement (OP4.10) are prepared as a standalone document but considered as part of this ESMF.

2. Sections below briefly describe the Project description, focusing on those that may trigger World Bank's safeguard policies (Section II); the safeguard screening process (Section III); and the implementation arrangement (Section IV). While the investment activities (Component 3) that have been identified before appraisal could adopt the mitigation measures identified in Step 4, the new activities to be identified during project implementation (Component 3-1 and 3-2) will apply from Step 1 to Step 4 including keeping proper documentation of the results.

## II. Project Description

3. The Project aims to establish key examples of integrated water resource management (IWRM) practices in the Lower Mekong Basin (LMB), at the regional, national and sub-national level. The activities will be implemented through the following three components:

- *Component 1. Regional Water Resources Management.* This component aims to increase dialogue, cooperation and understanding on IWRM principles among LMB countries. Key activities would include technical assistance, capacity building, meetings/workshops, study visits, and unlikely to trigger any Bank safeguard policies.
- *Component 2. National Water Resources Management.* Main objective is to support IWRM in Lao PDR, which accounts for over 30 percent of the Basin's flow. Key activities will include technical assistance, meetings, workshops, study visits, and other capacity building activities such equipment and vehicles, and rehabilitation of office and/or small building and unlikely to trigger the World Bank safeguard policies.
- *Component 3: Improved Floodplain and Aquatic Resources Management in Regionally Significant Areas.* The component aims to demonstrate a successful implementation of

IWRM practices regarding: (a) flood-plain management in selected river basins in Lao PDR; and (b) development of transboundary fisheries management in priority areas of the Lao PDR and Cambodia. The activities will be implemented through the following three subcomponents:

(3.1) *River Basin and Floodplain Management in the Lower Part of Xe Bang Fai (XBF) and Xe Bang Hian (XBH) in Lao PDR*, key activities would include:

(3.1.1) supporting the development of river basin organizations and a basin planning framework focusing on “hotspots,” development of a floodplain management plan for the lower XBF and XBH, focusing on the junction between the tributaries and the mainstream Mekong; the Project would support technical assistance, training, and minor goods and office renovation;

(3.1.2) rehabilitating existing flood gates to restore flood-plain management and fish migration on 14,000 hectares and re-habilitation of irrigation infrastructure to support restoration of flood-plain rice cultivation and fish spawning on 8,500 hectares, together with providing support to improved, more water-efficient rice cultivation systems through civil works, equipment and extension support; and

(3.1.3) providing logistical support to the provincial administration of WREA and the Ministry of Agriculture (irrigation and fisheries departments) for the subcomponent implementation.

(3.2) *Support for Improved Management of Aquatic Resources in Lao PDR and Cambodia*, addressing the richest spawning grounds for the Mekong River, and key activities would include:

(3.2.1) Supporting community-managed fisheries management organizations in Champasak, Attapeu, Sekong Provinces (Lao PDR), and Stung Treng and Kratie Provinces (Cambodia), including development of participatory management plans, training on fisheries management and conservation, development and implementation of small scale livelihood demonstration activities (e.g. livestock raising and aquaculture) and commune development plans including support to priority rural infrastructure; the Project would provide training, establishment of the grievance mechanism, community outreach, operating costs, goods and minor civil works;

(3.2.2) Strengthening Public Sector Fishery Management for provincial and district fisheries institutions, in: (a) fish catch data collection, monitoring and regulation, together with the community fisheries organizations; (b) extension activities; and (c) support for indigenous species aquaculture and stocking through rehabilitation of hatcheries, technical assistance and study tours for fishermen. The Project would finance goods, works, training and operational costs; and

(3.2-3) Providing logistical support for component management to the fisheries departments in Pakse, Champasak province (Lao PDR) and in Phnom Penh (Cambodia), including operating costs and minor office renovation.

4. The M-IWRM is a regional project which will be implemented over a period of six years (2011-2016). The Mekong River Commission (MRC) through its secretariat will be the implementing agency for Component 1 while the Lao PDR agencies under the leadership of the Water Resources and Environment Administration (WREA) will be the implementing agency for Component 2 and Subcomponent 3-1. The Department of Livestock (DLF) of the Ministry of Agriculture and Forestry (MAF) and its provincial offices in Champasak, Sekong, and Attapeu are the implementing agencies for the Subcomponent 3-2 for Lao activities. The Fisheries Administration (FiA) of the Ministry of Agriculture, Forestry, and Fisheries (MAFF) is the implementing agency for the Cambodia activities under Subcomponent 3-2. In this context this ESMF will apply to Cambodia only for the activities to be implemented under Subcomponent 3-2.

### III. Key Safeguard Issues and Mitigation Measures

5. The World Bank (WB) has categorized the M-IWRM as a ‘*Category B*’ project and out of the ten safeguard policies, six policies are triggered: *Environmental Assessment (OP 4.01)*; *Pest Management (OP 4.09)*; *Indigenous Peoples (OP 4.10)*; *Involuntary Resettlement (OP 4.12)*; *Natural Habitats (OP 4.04)* and *International waterways (OP7.50)*. Given the project’s objective and scope, it is anticipated that M-IWRM activities will not cause serious negative environment and/or social impacts. An initial impact assessment (IESE), conducted for the activities that could be identified before appraisal, support this conclusion. Below summarizes key issues and actions to be undertaken during the implementation of M-IWRM.

6. ***Impacts due to civil works:*** Any investment activity/subprojects that involves construction work or changes to land or water use has the potential to generate negative environmental impacts. Project activities identified by appraisal suggested that the activities related to civil works would be limited to construction of small building (Component 2) and rehabilitation/construction of floodgates, village-based infrastructure such as roads, water supply, hatcheries, etc. (Component 3). Negative impacts due to these small-scale construction activities will be minimized through the application of good engineering practices/housekeeping that could reduce dust, noise, and waste generations as well as by keeping nearby communities informed. Medium-scale construction, or any other activity expected to produce modest, local environmental impacts which may be identified during project implementation will follow the safeguard screening procedures described in Section IV below. If an Initial Environmental Examination (IEE) is required by the Government’s EIA regulation, the Project will prepare appropriate documents and submit for government approval. Any large scale activities that require a full Environmental Impact Assessment (EIA) by the Government EIA regulation will not be allowed and this is included in the “*negative list*” (*Annex I*). Specific conditions to be included in bidding documents for each type of civil works will be provided in the safeguard operation manual.

7. **UXO.** Cambodia was subjected to heavy bombing during the Indochina war as well as extensive ordnance utilization during internal conflict, resulting in a safety risk of unexploded ordnance (UXO). UXO is a critical impediment to agricultural development and land utilization. As part of the overall consultation process and initial screening process, a rapid assessment will be carried out with the communities to identify possible UXOs, their locations and potential safety risk. If a safety risk is present, the project staff will contact Government agency responsible for UXO clearance and request for assistance in developing a simple plan to clear the UXO. Only after the actual clearance the Project will provide support for the proposed activity.

8. **Pest Management:** Implementation of Subcomponent 3-2 for Cambodia activities may involve development of very small community irrigation scheme that is selected as a mean for livelihood options to mitigate the negative impacts due to limited resources use as defined by the WB's safeguard policy (OP 4.10) and unlikely to increase the pesticides and fertilizer usages. However, to mitigate this potential minor impact, the M-IWRM will prohibit procurement of large pesticides using the "negative list" and provide training to key staff and farmers on integrated pest management and safe use of pesticides, and this will be integrated as part of the safeguard training. This measure is considered adequate for Cambodia subcomponent.

9. **Critical Natural Habitats:** Implementation of Subcomponent 3-2 for Cambodia will also involve the Ramsar site located between Lao PDR-Cambodia border and Stung Treng. Although the overall impacts are expected to be positive, special attention will be given to ensure that the activities in and/or nearby the Ramsar sites will be undertaken with care and consistency with the management plan of the sites and in close coordination with the agency responsible for managing the Ramsar site. 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.

10. **Indigenous Peoples:** Implementation of Subcomponent 3-2 will involve indigenous peoples. The project will follow the key principles of the WB's policy concerning indigenous peoples (OP/BP 4.10), which are to "ensure that a) consultation process constitutes free, prior and informed consultations leading to 'broad community support', b) indigenous peoples do not suffer adverse impacts during the development process," and c) they receive "culturally compatible social and economic benefits." Indigenous Peoples, as used for the M-IWRM for Cambodia, includes those living in Stung Treng and Kratie provinces that may include Khmer, Laos, Kavet, Kuoy, Vietnamese, Chinese, Phnong, Lun, Brao, Kreung, Chams, Tum Puon, Kachock, and Jarai. An Indigenous Peoples Development Framework (IPDF) has been prepared as a standalone document to provide guidance on consultation and mitigation measures when indigenous peoples are involved. If adverse impacts are expected an Indigenous Peoples Development Plan (IPDP) will be prepared and submitted to WB for clearance.

11. **Land Acquisition:** The Project will not involve resettlement or large amount of land acquisition, but may require small amount of land for the community infrastructure and/or community fisheries. Resettlement and demolition of houses and businesses will not be allowed and this has been included in the “*negative list*”. A Resettlement Policy Framework (RPF) has been prepared as a standalone document and it will be applied to Subcomponent 3-2 when land acquisition is involved. The RPF define the definition of Project Affected Persons (PAPs), eligibility and entitlements, content of Resettlement Action Plan (RAP), and the consultation process, including grievance procedures and monitoring requirement. Voluntary land donation will be allowed only when it meet the description described in the RPF.

12. **Resource Access Restriction:** Implementation of fisheries management (Sub-component 3-2) may restrict access to resources, notably efforts to enforce national laws or local regulations in protected and/or conservation areas. This concern has been considered during the Project design and provision of small scale livelihood demonstration activities has been included in the Subcomponent 3-2. During pre-appraisal and the following approach was accepted, in principle, by local communities and local authorities as well as local and international non-governmental organizations active in the project area:

- First, better fisheries management would benefit the local communities in the long run by establishing sustainable fisheries management;
- Second, the fisheries management plan would be developed through full participation and ownership of the respective communities; and
- Third, the Project also envisages provision of livelihood development options (which will be selected through participatory planning with affected populations) in order to mitigate potential negative impacts.

13. The implementing agencies of this subcomponent will finalize the activities following this approach and keep proper documentation and filing. If the affected population is ethnic minority as defined by OP 4.10, consultation will follow the principle and process described in the IPDF and proper documentation and filing will also be required. Special attention will be given to minimize negative impacts on women and other disadvantage groups.

14. **Gender:** During preparation of M-IWRM, attention has also been given to encourage women to play an active role in the consultation process. During implementation effort will be continued to make sure that women are: (a) consulted and their concerns will be addressed; (b) consulted and trained on chosen livelihoods that would restore their income and improve their living standards, (c) given the opportunity to represent the community groups meetings, focused-group discussions, planning and implementation, and (d) represented equally in the Grievance and Redressal Committees (GRCs).

15. **Unidentified activities:** There are activities that could not be identified before appraisal. To avoid or mitigate these risks, a safeguard screening process comprising a “*negative list*”, a simple impact assessment, and specific actions are provided to ensure that the negative issues are identified and adequate mitigation measures are undertaken. This is to ensure that the M-IWRM activities are in compliance with the Government’s regulations

and the WB's safeguard policies, and if possible maximize positive gains. The safeguard screening criteria and process is discussed in Section IV below.

#### **IV. Safeguard Screening Process**

16. Safeguard screening and assessment was conducted for the activities identified before appraisal and the required mitigation measures have been identified and they will be implemented and monitored during implementation. All the activities to be identified during Project implementation will undergo a rapid safeguard screening prior to their approval and implementation. The screening procedures will determine (i) if the proposed activity is eligible for M-IWRM funding; (ii) if and what safeguard issues need to be addressed; and (iii) what safeguard documents need to be prepared. The M-IWRM will keep records of all proposals received and screening decisions for review by the WB. Below describes the four main steps in the safeguard screening and approval process:

##### ***Step 1: Eligibility Screening.***

17. The project will apply a 'negative list' with a number of non-eligible activities to avoid adverse social and environmental impacts which cannot be adequately mitigated or are not eligible for WB Financing. The M-IWRM negative list is given in ***Annex 1*** will be considered as the first safeguard screening for all proposed Project activities. Close consultation with WB safeguard specialists may be necessary.

##### ***Step2: Technical Safeguard Screening.***

18. For activities which are not on the 'negative list', a technical screening process will be applied to identify possible social and environmental safeguard issues. Two standalone policy frameworks related to ethnic groups and compensation and resettlement have been prepared while a section on safeguards will be included in the Project operation manual. An environmental and social screening form will be provided in the manual will enable the Project staff to identify the possible safeguard issues and decide upon subsequent safeguard documents to be prepared. Consultation with local government, local communities, and interested mass organization and/or NGOs would be important. Further, Efforts should be made to enhance the environmental benefits and synergy with MRC activities and to mainstream environmental issues into the project activities. ***Table 1*** describes key criteria and actions to be carried out during the technical screening process. The screening results should be attached to the proposed activities/subproject during the approval process. If significant issues are anticipated, in consultation with the WB's will be necessary.

19. If the Project activities involve small civil works and do not require the government approval for any documents, the good engineering practices (***Annex 2***) will be applied and specific requirements, including a "chance find" clause, will be included in the bidding and contract document and the monitoring results and performance of contractors will be incorporated in the Project progress report.

20. If the proposed activities/areas involve indigenous peoples, the objective, procedures, and process, including documentation describes in the IPDF will be followed and the results included in the progress report. If negative impact to indigenous peoples is anticipated, an Indigenous Peoples Development Plan (IPDP) will be prepared which would require WB review and clearance.

### **Step 3: Safeguard documentation and clearance**

21. If the activities/subprojects require government approval according to the EIA regulation and/or other regulations, the project staff will discuss with the respective agencies on the logistical arrangements for incorporation of the identified safeguard issues and document preparation and inform WB. The project will follow the government regulations and secure the government approvals and clearances while periodically informing the WB.

22. If the proposed activities/subprojects involved land acquisition, compensation, and/or resources use restriction, the policy and procedures described in the RPF will be followed, including proper recording and reporting.

### **Step 4: Safeguard implementation, supervision, monitoring, and reporting**

23. During implementation, the project implementation units (PIUs) responsible for each subcomponent will be responsible for ensuring effective implementation of safeguard measures in close consultation with local authorities and local communities. Provision of safeguard training would be necessary to ensure clear understanding of safeguard measures and enhance their effectiveness. The project management unit (PMU) and/or the national implementing agency will periodically supervise and monitor the safeguard implementation performance and include the progress/results in the Project progress report. Information regarding the safeguard measures and performance should be periodically disclosed to the public. The WB will conduct safeguard supervision, monitoring, and post review.

## **V. Implementation and Monitoring Arrangement**

24. Overall responsibility for the compliance with the ESMF is shared between the project implementation units (PIUs) responsible for implementation at subcomponent level and the project management unit (PMU) responsible for the overall supervision of Cambodia activities. *Figure 1* defines roles and responsibility of the PIUs and PMU. Each unit will assign a safeguard coordinator to be the focal point and training will be provided to the focal points as well as other key staff.

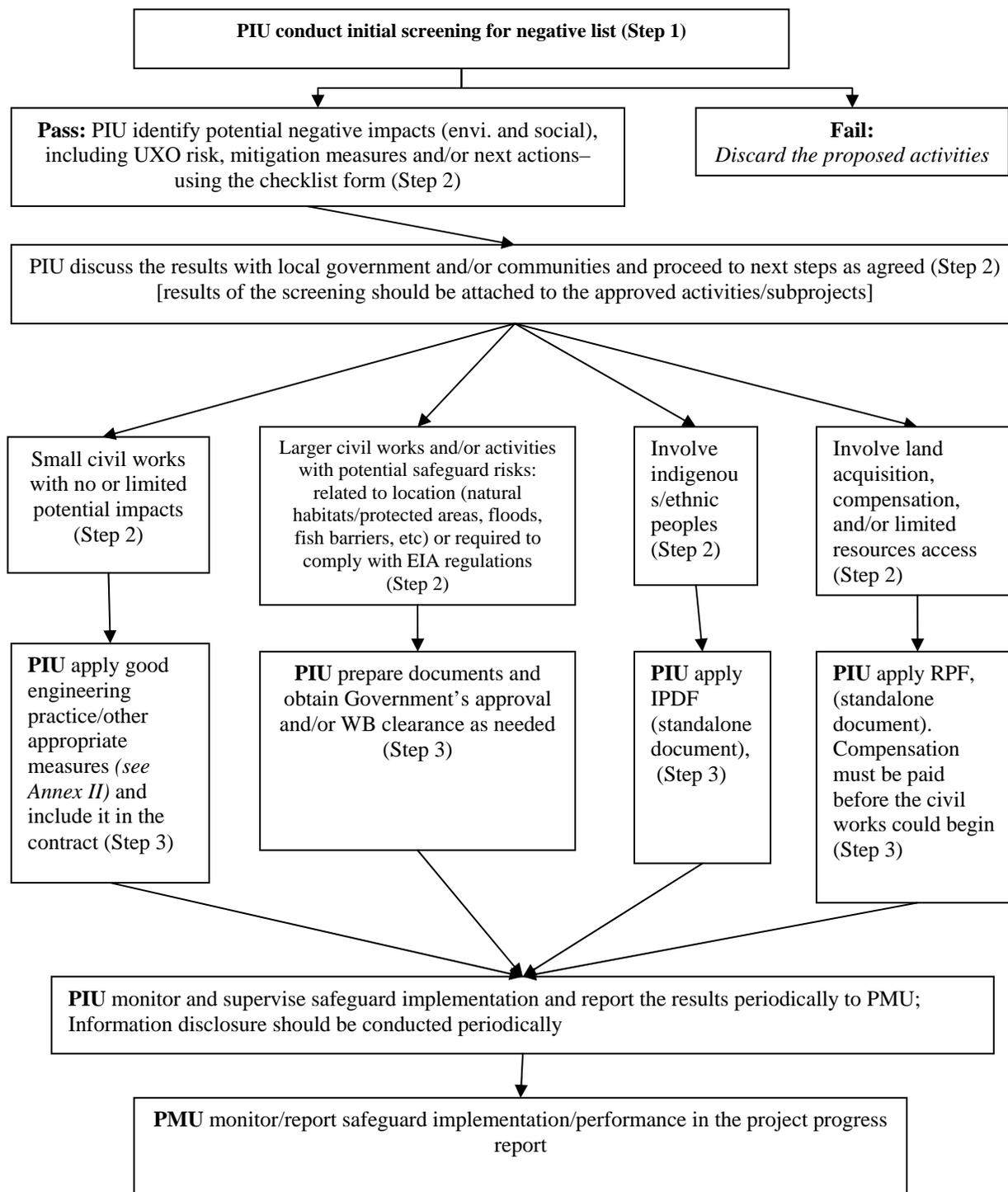
Table 1. Guidance on safeguard issues and actions

Potential negative impacts	Required mitigation actions	Remarks
(1) Permanent or temporary loss of land or resources for any families, including restriction of access to natural resources and/or impediments to movement of people and animals (Includes patrolling activities)	<p>Identify the amount and nature of land required, owner, and/or other issues and prepare a Resettlement Action Plan (RAP) to provide compensation and/or assistance following the Resettlement Policy Framework (RPF) for Cambodia.</p> <p>The project will support to increasing awareness of PAPs about the Grievance Redress mechanism, and building capacity of the existing Grievance Redress mechanism on the required tasks, <u>including dealing or mediating complaints, recording/reporting and monitoring proposed resolutions.</u></p>	Prior consultation with WB, proper documentation, and Post review by WB may be necessary.
(2) Potential social conflicts arising from land tenure and land use issues and/or in water supply rights or related social conflicts	<p>Develop a mitigation measure for conflict resolution through close consultation with stakeholders and placed within Project processes, inherently community-based and collectively managed, not precluding the involvement of third-party/external mediators.</p> <p>Develop Village Resources Use Agreement;</p> <p>Using existing local Conflict Management mechanisms, that most likely led by by senior/elderly respected persons, or leaders of IP/Ethnic Minority groups.</p>	If the conflicts may deteriorate livelihoods or living conditions of women or the poorest families in the sub-project area or involve political influence, or likely to be escalated to higher level, inform WB
(3) Likely to adversely affect indigenous peoples.	<p>Carry out social assessment process through free, prior, and informed consultations and, if necessary, prepare an Indigenous Peoples Development Plan (IPDP) in accordance with guidance in the Indigenous Peoples Development Framework (IPDF) for Cambodia.</p> <p>The project will support to increasing awareness of PAPs, in respective languages of IP groups, about the Grievance Redress mechanism, and building capacity of those involved in</p>	Prior consultation with WB, proper documentation, and Post review by WB may be necessary.

	existing <u>Grievance redress mechanism on the required tasks, including dealing or mediating complaints from IP individual/groups, recording/reporting , and monitoring proposed resolutions.</u>	
(4) Likely to increase the use of pesticides and/or toxic chemicals that could affect soil quality, water quality, and/or water users downstream	Prohibit the use of large amount of pesticides and toxic chemicals; Provide training on integrated pest management and organic farming, and safe use of pesticides when needed.	
(5) Activities to be carried out in a Protected Area, Wildlife Reserve, Buffer Zone, Wetlands, or other conservation area or activities involve civil works that may cause significant air, noise, and/or water pollution, soil erosion, and/or create public health risks, wildlife hunting, or impacts on downstream water uses.	<ul style="list-style-type: none"> <li>• Prepare an Environmental Management Plan (EMP) to mitigate the potential negative impacts and/or to reduce safeguard risks; some guidance on the mitigation measures would be provided in the safeguard operation manual.</li> <li>• Conduct consultation with local authority and communities.</li> <li>• Carry out the activities in the Ramsite site in line with the Ramsite management plan and in close consultation with the management authority.</li> </ul>	<p>The project implementation unit (PIU) and/or the project management unit (PMU) will ensure that the activities are compliance with the government regulations.</p> <p>Prior consultation with WB, proper documentation, and Post review by WB may be necessary.</p>
(6) Unsustainable forestry utilization, including non-timber forest products (NTFPs); introduction of non-native species; causing flood to nearby area; and/or blockage of fish migration, including unsustainable use of other aquatic animals (OAAs).	Consult with local community to reach an agreement on how to avoid/mitigate the potential negative impacts and when possible increase sustainable use of forestry products, fisheries, and other aquatic animals. If a new species is involved making sure that the new species is already present in the vicinity or is known from similar setting to be non-invasive. If restriction of natural resources, social conflict, and/or ethnic groups as indicated in (1), (2), (3) follow the mitigation measures identified in (1), (2), (3).	<p>Excluding logging, harvesting or processing of timber products.</p> <p>Close consultation with WB safeguard specialists is recommended.</p>
(7) Involve UXO risk?	If yes, contact responsible agency and complete the clearance before conducting project activities	PIU to take the lead in securing safety of the project area
(8) Activities involve small civil works that may cause small amount of air, noise, and/or water pollution, soil	<ul style="list-style-type: none"> <li>• Apply good engineering and/or good housekeeping with close monitoring and supervision, including maintaining close consultation with</li> </ul>	PIU and PMU will ensure that the appropriate mitigation measures are included in the contract and that the

erosion, and/or create public health risks, wildlife hunting, or impacts on downstream water uses.	local population. <ul style="list-style-type: none"> <li>• The contract will also include a special clause on “<i>chance find</i>”.</li> </ul>	contractor effectively implement them.
(9) Opportunity to enhance environmental benefits, mainstream environmental issues, and/ or synergy with other MRC activities	<ul style="list-style-type: none"> <li>• Closely coordinate with the countries and MRC during the project implementation.</li> </ul>	This is to enhance positive impact of the project.

Figure 1 – Schematic flowchart to determined safeguard measures



## ***Annex 1: Negative List of Prohibited Activities***

To avoid adverse impacts on the environment and people, the following activities are explicitly excluded from funding under M-IWRM:

- (i) Relocation, and/or structural demolition of any houses or business.
- (ii) Land acquisition that affect more than 200 persons or 40 households.
- (iii) New settlements or expansion of existing settlements inside natural habitats and existing or proposed protected areas.
- (iv) Likely to create adverse impacts on ethnic groups within the village and/or in neighboring villages or unacceptable to ethnic groups living in a village of mixed ethnic composition.
- (v) Loss or damage to cultural property, including sites having archeological (prehistoric), paleontological, historical, religious, cultural and unique natural values.
- (vi) New roads, road rehabilitation, road-surfacing, or track upgrading of any kind inside natural habitats and existing or proposed protected areas.
- (vii) Purchase of gasoline or diesel generators and pumps; guns; chain saws; large amount of pesticides, insecticides, herbicides and other dangerous chemicals; asbestos and other investments detrimental to the environment; if pest invasion occurs, small amount of eligible and registered pesticides in Lao PDR could be allowed.
- (viii) Forestry operations, including logging, harvesting or processing of timber products; however support to sustainable harvesting and processing of NTFPs are allowed if accompanied with a management plan for the sustainable use of the resources.
- (ix) Introduction of non-native species, unless these are already present in the vicinity or known from similar settings to be non-invasive.
- (x) Significant conversion or degradation of natural habitat or where the conservation and/or environmental gains do not clearly outweigh any potential losses.
- (xi) Large scale construction or small/medium scale construction expected to lead to significant negative environmental impacts. Large project that requires full EIA will not be funded.

## **Annex 2. Good Engineering Practices and Some Mitigation Measures**

### **2.1 Good engineering and housekeeping practices**

The practice of housekeeping involves proper storage, use, cleanup, and disposal of the various materials used during construction for human and environmental safety. The following good housekeeping practices are required for all M-IWRM-funded activities:

#### **DO:**

1. Limited working hour during the day time, especially in residential areas, and control driving speed;
2. Minimize earth excavation and appropriate disposal of spoil;
3. Minimize opening of new borrow pits and ensure proper closure;
4. Minimize traffic congestion, dust and noise generation;
5. Proper maintenance of construction equipment and vehicles;
6. Provide appropriate safety sign (day and night) and closely inform local residents;
7. Avoid spill of used oil and other toxic materials, including safe transportation and storage;
8. Apply good housekeeping in the construction and/or storage sites to ensure safety of workers and peoples (Gather up and remove debris to keep the work site orderly and safe; Plan and implement adequate disposal of scrap, waste and surplus materials; Keep the work area and all equipment tidy. Designate areas for waste materials and provide containers; Keep stairways, passageways and ladders free of material, supplies and obstructions; Secure loose or light material that is stores on roofs or open floors; Keep materials at least 2m (5ft) from openings, roof edges, excavations or trenches; Remove or bend over nails protruding from lumber; Keep hoses, power cords, welding leads, etc from laying in heavily traveled walkways or areas; Ensure structural openings are covered/protected adequately; Provide the appropriate fire extinguishers for the materials found on-site. Keep fire extinguisher stations clear and accessible; etc.)
9. Ensure access to clean water and latrines by workers and provide mosquito net.
10. Avoid social/cultural conflict between workers and local population.

#### **DO NOT:**

1. Do not permit rubbish to fall freely from any locations of the project and/or access by animals (dogs, cats, pigs, etc.). Use appropriate containers.
2. Do not throw tools or other materials.
3. Do not raise or lower any tool or equipment by its own cable or supply hose.
4. Use grounding straps equipped with clamps on containers to prevent static electricity buildup.
5. Do not allow hunting of animals by workers in protected areas.

#### **SPECIAL NOTE ON FLAMMABLE/EXPLOSIVE MATERIALS:**

1. Store flammable or explosive materials such as gasoline, oil and cleaning agents apart from other materials.

2. Keep flammable and explosive materials in proper containers with contents clearly marked.
3. Dispose of greasy, oily rags and other flammable materials in approved containers.
4. Store full barrels in an upright position.
5. Store empty barrels separately.
6. Post signs prohibiting smoking, open flames and other ignition sources in areas where flammable and explosive materials are stored or used.
7. Store and chain all compressed gas cylinders in an upright position.
8. Mark empty cylinders and store them separately from full or partially full cylinders.
9. Ventilate all storage areas properly.
10. Ensure that all electric fixtures and switches are explosion proof where flammable materials are stored.

2.2 The following “*chance find*” procedures to be included in all civil works contract:

If the Contractor discovers archeological sites, historical sites, remains and objects, including graveyards and/or individual graves during excavation or construction, the Contractor shall:

- Stop the construction activities in the area of the chance find;
- Delineate the discovered site or area;
- Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities or the National Culture Administration take over;
- Notify the supervisory Project Environmental Officer and Project Engineer who in turn will notify the responsible local authorities and the Culture Department of Province immediately (within 24 hours or less);
- Responsible local authorities and the Culture Department of Province would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by the archeologists of National Culture Administration. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historic, scientific or research, social and economic values;
- Decisions on how to handle the finding shall be taken by the responsible authorities and Culture Department of Province. This could include changes in the layout (such as when finding an irremovable remain of cultural or archeological importance) conservation, preservation, restoration and salvage;
- Implementation for the authority decision concerning the management of the finding shall be communicated in writing by relevant local authorities; and
- Construction work could resume only after permission is given from the responsible local authorities or Culture Department of Province concerning safeguard of the heritage.

### 2.3 Environmental effects and mitigation measures for small public buildings, including hatcheries

Activity	Potential Effects	Possible Mitigation Measures
<b><i>I. Construction</i></b>		
1. Site clearing	Disturbance of habitats and/or nearby community	Inform nearby community and local authority
2. Civil works building	Noise, dust, vibration, traffic, wastes, creation of borrow pits	Reduce traffic, control noise, dust, vibration measures, landscaping
<b><i>II. Operations</i></b>		
1. Wastes from the operation of building And/or hatcheries	Water pollution, garbage.	Ensure proper treatment of wastes and collection of garbage.

### 2.4. Environmental effects and mitigation measures for boreholes

Activity	Potential Effects	Possible Mitigation Measures
Sitting	Loss of land Land degradation Nuisance and aesthetic impacts	Consultation with communities, Reallocation of land, Landscaping (planting of trees/crops)
Drilling	Disturbance of stream channels, aquatic fauna Social disruption by construction workers Construction hazards New diseases (STD)	Re-vegetation, Establish settlement location for workers out of village to mitigate social interactions
Pump installation	Ground and surface water contamination by oil, etc	Experienced drillers only Enforcing standard safety procedures
Operation	Reservoirs may be breeding areas for water/vector-borne diseases (worms, mosquitoes); Water may be contaminated during transport or storage; Spills and leakage contamination of water; Reduction in water quality because of decomposed matter; Over pumping of ground water causing a lowering of ground water table; Disruption of downstream hydrology	Incorporate health and sanitation education program; Ensure adequate provision for the operation management and maintenance of facilities (including proper staff and community training).

## 2.5 Environmental effects and mitigation measures for rural roads

Phase/Activity	Potential Effects	Possible Mitigation Measures
Planning/ design	<p>Land acquisition, encroachment to protected areas and/or natural habitats, cultural sites, etc.</p> <p>Too high standards and too much earth works excavation;</p> <p>Flood due to obstruction of drainage.</p> <p>Location of campsite must be accepted by the local people.</p>	<p>Apply appropriate standards, size, and direction of the roads to minimize the impacts; selection of the route should be made through consultation with local people; safety and dust impacts during construction and operation should be considered.</p> <p>Any compensation measures must be completed before construction begins.</p>
Construction	<p>Increase air and noise pollution for any nearby settlements; Introduction of outside workforce and other negative social consequence; Waste generations from construction sites and work camps; Increase uncontrolled use of firewood and hunting of fishes and wildlife; Increase pollution from workshops; Increase risk due to traffic safety; Opening of borrow pits; etc.</p>	<p>Control contractors' vehicle speeds and noise; Contractor employs local people where possible; Establish and implement waste management plan; Contractor supplies alternative fuel for cooking and heating in the labor camp and provide adequate food supply; apply good housekeeping and good engineering practices at all work place and work camps; provide adequate road safety signs and measures; proper selection of borrow pits and ensure proper closure.</p>
Operation.	<p>Increase dust and risk due to road safety.</p>	<p>Install appropriate signs and cooperate with local residents to take actions to promote road safety.</p>

## 2.6 Environmental effects and mitigation measures for (medium scale) irrigation schemes

Potential Negative Effects	Possible Mitigation Measures
Soil erosion	Proper design and lay-out of furrows or field avoiding too steep gradient; Land leveling; Design of terraces on hillsides minimizing surface erosion hazard; Maintain vegetation cover
Water logging of soils	Regulation of water application to avoid over-watering; Installation and maintenance of adequate drainage system; Use of lined canals or pipes to prevent seepage; Accurate calculation of delivery irrigation requirements
Salinization of soils	Leaching of salts by flushing soils periodically; Cultivation of crops with salinity tolerance
Scouring of canals	Design of canal system to minimize risk; Use of canals lined with rocks
Clogging of canals by sediment	Measures to minimize erosion on fields; Design and management of canals to minimize sedimentation; Provision of access to canals for removal of weeds and sediments
Leaching of nutrients from soils	Avoidance of over watering; Replacement of nutrients through crop rotation; Accurate calculation of fertilizer requirements,
Algal blooms and weed proliferation	Appropriate application of fertilizers (quality, quantity, timing)
Clogging of canals by weeds	Design and management of canals to minimize weed growth; Provision of access to canals for treatment or removal of weeds
Deterioration of river quality below irrigation subproject and contamination of local groundwater (higher salinity, nutrients, agrochemicals) affecting fisheries and downstream users	Improved water management; Improved agricultural practices and control of inputs (particularly pesticides and chemical fertilizers); Imposition of water quality criteria
Reduction of downstream flows affecting flood plain use, flood plain ecology, riverine and estuarine fisheries, users of water, dilution of pollutants	Relocation or redesign of sub-project; Regulation of take-off to mitigate effects; Compensatory measures where possible
Encroachment on swamps and other ecologically sensitive areas	Choose sub-project's site to avoid or minimize encroachment on critical areas; Establishment of compensatory parks or reserved areas
Threat to historical, cultural or	Choose sub-project's site to prevent loss; Salvage or

aesthetic features	protection of cultural sites
Alteration or loss of flood plain vegetation and disturbance of coastal ecosystems (mangroves)	Choose sub-project's site to be in less vulnerable area; Limitation and regulation of water take-off to minimize problems to the extent possible
Introduction or incidence of water-borne or water-related diseases	Use of lined canals or pipes to discourage vectors; Avoidance of stagnant or slowly moving water; Installation of gates at canal ends to allow complete flushing; Filling or drainage of borrow pits along canals and roads; Water testing; Disease prophylaxis and treatment
Disease and health problems from use of waste water irrigation	Wastewater treatment (e.g. settling ponds prior to use); Establishment and enforcement of standards for wastewater use.
Conflicts over water supply and inequalities in water distribution throughout service area	Means to ensure equitable distribution among users and monitor to assure adherence; Establishment of effective water users associations
Over-pumping of groundwater	Limitation of withdrawal so that it does not exceed "safe yield" (recharge rate)
<b><i>External</i></b>	
Water quality deteriorated or made unusable by upstream land use and pollutants discharge	Control of land use in watershed areas; Control of pollution sources; Water treatment prior to use
Failure of upstream dams or reservoirs on which the sub-project activities depend	Check dam or reservoir safety prior to sub-project implementation