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MEKONG INTEGRATED WATER RESOURCES MANAGEMENT PROJECT PHASE 3

CAMBODIA FISHERIES ADMINISTRATION

ENVIRONMENTAL MANAGEMENT PLAN FOR THE HATCHERY SUBPROJECT



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Acronyms

BP	Bank Procedures
CMAC	Cambodian Mine Action Centre
CNMC	Cambodia National Mekong Committee
CSC	Construction Supervision Consultant
EA	Environmental Assessment
EMP	Environmental Management Plan
ESMF	Environmental and Social Management Framework
FiA	Fisheries Administration
GP	Good Practices
MAFF	Ministry of Agriculture, Forestry and Fisheries
MoE	Ministry of Environment
OP	Operational Policy
DoE	Department of Environment
RGC	Royal Government of Cambodia
UXO	Unexploded Ordnance
WWF	World Wildlife Fund

1. Introduction

1. Mekong Integrated Water Resources Management Program a regional Series of Project (SOP) supporting Lao PDR, Cambodia, Vietnam, and the Mekong River Commission (MRC). Following the first phase (Lao PDR and MRC) and the second Phase (Vietnam), the World Bank and the Royal Government of Cambodia (RGC) has been collaborating closely for the preparation of the third phase (M-IWRM3). The M-IWRM3 comprises the following two components; (a) Component 1: Fisheries Resources Management in Stung Treng and Kratie Province, and (b) Component 2: River Basin Management in Northeastern Cambodia. Cambodia National Mekong Committee (CNMC) is the overall executing agency of M-IWRM3. However, implementation of Component 1 has been delegated to the Fisheries Administration (FiA). FiA has established a component management unit (CMU) within its Inland Fisheries Research and Development Institute to implement and manage the component.

2. Under Component 1, construction of a hatchery in Stung Treng is proposed. This EMP sets out the principle and framework for the measures to mitigate potential negative environmental impacts during both construction and operational phases for the hatchery. This environmental management plan (EMP) has been developed based on the outline of the simple environmental management plan that is included in the Environmental and Social Management Framework (ESMF) which has been prepared for the project.

3. The objective of this EMP is to (a) describe detailed potential negative impacts due to the subproject implementation and mitigation measures to be taken during the implementation and operation to eliminate or offset adverse environmental impacts or reduce them to acceptable level, and (ii) the actions needed to implement these measures.

2. Background

4. The Royal Government of Cambodia (RGC) has requested a credit for the Mekong Integrated Water Resources Management Project Third Phase (M-IWRM3) from the Work Bank to establish sound fisheries resources management and water resources management. The M-IWRM3 will include construction of a new hatchery in Stung Treng province under Component 1, aiming at carrying out aquaculture of a few indigenous species as indicated in Table 1. The main objective of the proposed hatchery construction (the subproject) is to contribute to (a) the production and dissemination of the fingerlings of the few indigenous species in the target project area (Stung Treng and Kratie Province) for the grow-out in the private sector and for the stock enhancement (mostly in the large natural ponds) and (b) the training of the local farmers especially for the fish culture. The proposed subproject is being prepared and will be implemented by Fisheries Administration (FiA).

5. In accordance with the World Bank's safeguard policies and procedures, including OP/BP/GP 4.01 Environmental Assessment, the subproject has been classified as a Category B for environmental assessment purposes. Environmental due diligence for Category B projects requires the Borrower to prepare the present document, called "Environmental Management Plan" (EMP), and to implement it in order to prevent, minimize or mitigate site-specific environmental impacts.

6. The present EMP has been prepared by the FiA to ensure that maintenance and rehabilitation under the Project protect the populace and environment from key risks such as noise, soil erosion on steep slopes, protection of waterways, etc. The EMP also includes a check on potential impacts on Physical Cultural Resources (PCR). Archaeological chance finds are covered by a chance-finds procedures clause included in the works contract.

3. Environmental Setting of the Proposed Hatchery Construction Works

7. The proposed land (4.1 ha) assigned for the hatchery construction belongs to the Stung Treng Fisheries Administration Cantonment. The availability of this land for re building the hatchery in the same location with the abandoned one was confirmed by the Official letter from the Ministry of Agriculture (add date). . The hatchery is located in Srepo village, Srapresay commune, Stung Treng District, about 5.4 km North of Stung Treng (see Figure 1). The hatchery site is located outside the Stung Treng Ramsar Site and about 7 kilometer far from its designated boundary. The size of the overall hatchery station is 4.1 ha and the station is about 50 meter far from the Sekong River ¹ bank and 1.5 km from the closest house. It will be placed on the rocky road which leads from Strung Treng to Sesan. The end of the land is near a small stream which can be used in as the drainage system - this stream flows into Sekong river. Since the land is very long, its level is needed to be adjusted before pond construction. The station will consist of (a) 3 buildings (fish hatchery, office with accommodation, and storage room), (b) concrete tanks for the production of moinas (5 tanks) and the keeping of the fingerlings (10 tanks) and (c) the earthen ponds. The staff will include 8 people. The hatchery will include a set of large tanks designed for the reproduction of the carps, with a pair of large concrete tanks and 8 circular tanks made of fiberglass.

8. Water will be supplied to the ponds by pumping from the Sekong River. Water will be first pumped into the reservoir and then into the ponds. The reservoir will contribute to the water settling, especially during the rainy season when the water in the Sekong River is very turbid. The hatchery uses up to 250 cubic meters which is very little as compared to 90 billion cubic meters of the annual flow of the Sekong River.

9. Wastewater from the hatchery station including domestic wastewater and wastewater from fish ponds will be treated through septic tanks and wastewater treatment pond respectively. Wastewater from fish ponds after treated will be sent back to the reservoir for recycling.

¹ Sekong river is an international river that originates from Vietnam and flows through south Laos and then northeast Cambodia. It is a tributary of Mekong river. The hatchery was notified to China and Myanmar as per OP 7.50. Laos and Vietnam are part of the regional program.



Figure 1: Location map of the hatchery station subproject

3.1 Summary of the likely impacts of the subproject

10. Construction of a new hatchery is to aim to contribute to the conservation of the fisheries resources in the Mekong River. Promoting the aquaculture of the indigenous fish species is considered as one of the means of conservation.

11. On the abandoned hatchery, there is no previous structure in this site. Only remaining things are abandoned ponds. So, there is no need for dismantling anything during preconstruction. There are possible adverse impacts from the subproject during: (a) construction and (b) operation phases summarized as follows:

3.1.1 Construction Period

12. The negative impacts anticipated during construction include those resulting from: (i) extraction and transport of construction materials; (ii) digging fish ponds; (iii) disposal of construction wastes; and (iv) potential soil erosion and flood.. The details are as follows:

• *Extraction of construction materials.* According to the Cambodia Law a license is required for the extraction of any natural resources such as stone and gravel. Also, crushing operators should have an environmental permit covering the operation of their equipment. All contractors under the subproject will be required to use only fully licensed and permitted operators as sources for raw materials. Such certificates are periodically renewed, and contractors should ensure that they have on file copies of

valid documentation and provide them to the FiA. No major impact during the transport of the materials is envisaged since all quarries identified should have proper access roads. However, crushers and vibrating screens will generate significant noise and dust during crushing and screening operations.

- *Construction related waste materials.* Technical specifications currently in use in Cambodia require the collection and containment of all waste materials with bituminous content in specific landfills. There is no licensing requirement for the transport of waste materials but all contractors would be required to conform to environmental regulations and practice relating to proper disposal. The identification of the disposal site to be used and the appropriate quantities for each site are to be included as part of the documentation of the hatchery construction.
- Short-term impact from *noise, dust, vibration*, and *traffic accident* during the construction is inevitable. Noise levels will increase due to movement of construction machinery and vehicles. This impact will be minimized under the subproject by (i) specifying in all subproject contracts the responsibility of contractor to undertake appropriate work site mitigation actions as a part of their management of work sites, and (ii) the supervision of compliance of contractors by the Construction Supervision Consultant/field engineer. Mitigation measures may include the following actions: use of sprinklers to wash down roads and suppress dust emissions during soil transport; cover vehicles to prevent spills and transport borrow materials during daytime only; plant dust screening vegetation along roadsides and at locations sensitive to air pollution like schools, hospitals, etc; reduce noise by using noise absorbing/protecting building materials, planting noise absorbing trees, provide workers with ear plugs and helmets and generally prevented from prolonged exposure to high noise levels, etc.

13. However, the magnitude of the impacts will not be substantial and can be mitigated with implementation of proper management; the structural works would be of small scale, and the location of the hatchery is far away from the residential area.

14. *Physical Cultural Resources (PCR).* Construction may uncover archaeologically or culturally significant findings. Consideration of such concerns is provided in the works contracts that will include requirements that the contractor is obliged to look for chance finds and immediately stop the construction work at the contested location and alert the Engineer and the responsible authorities in case of chance finds..

15. This EMP sets out the provisions similar to the Environmental Codes of Practice to be attached to the civil works contract (Annex 1) in order to mitigate above-mentioned potential negative environmental impacts during construction period.

3.1.2 Operation Period

16. Once the hatchery is constructed, the hatchery would be operated under the Stung Treng Province of the FiA. There is no cumulative impact from the proposed hatchery. Also, there is no impact on the ecosystem of the ramsar site since the hatchery station is located outside and in downstream of the ramsar site. Potential negative environmental impacts during the operational period include: (a) Impacts from the potential floods, (b) wastewater and sediment discharge from the hatchery, (c) disposal of sludge, (d) impacts on wild stock's degeneration. The analysis and the associated mitigation measures is summarized below:

- *Impacts from potential floods.* Because the hatchery station is close to the river bank of Sekong River (50 meters from the riverbank) potential erosion and floods are foreseen since the area, including the proposed land was flooded in years of 1996 and 2000. To mitigate this potential soil erosion and flood, the detailed design should take into account hydro-meteorological data and geological surveys (e.g., erosion rate, peak flood, annual rainfall, soil texture, etc.) for the main structure of the hatchery.
- *Wastewater and sediment from the hatchery.* Long-term environmental impact includes generation of wastewater and sediment from fish ponds. The conceptual design has proposed the following two measures to mitigate these impacts: (a) reuse the water through filtration and minimize the discharge (at this moment, the estimated discharge amount is about 250 cum per year, which is about 0.003 percent of the annual flow of the Sekong River (90 billion cu m) and (b) installation of a nutrition stripping pond to reduce the organic materials and sediment from the discharged water. Further under the hatchery operational plan, the quality of discharged water shall be monitored periodically.
- Accumulated Sediments from the Ponds. The sediment in the ponds will accumulate and the hatchery needs to be cleaned from time to time (semi-annually) by operation unit under FiA. The amount of the sediment is not large (less than 1 cubic meter per year) and can be disposed in a temporary designated area within the hatchery. A large part of the nutrients accumulate into the sediments. Therefore, the sediment periodically removed from the bottom could be spread on the embankment of the ponds and used for either reinforcement or gardening if toxicity results are within the admissible limits. The sediment could be also spread as fertilizer onto the paddy fields once confirmed that it does not contain hazardous chemicals.
- *Degeneration of Wild stocks.* A list of 9 indigenous fish species is presented in Table 1 below. It is known that the genetic deterioration would occur if the same broodstock is being used for a long time. To mitigate the risk of losing genetic diversity, under this subproject, the following principles of broodstock management will be conducted: (a) for each of aquaculture species, in general, the effective population size of at least 50 individuals will be maintained at 50 individuals; (b) any type of hybridization will be prohibited, (c) broodstock will be collected from the wild every year. With all measures, it is expected that genetic integrity of the wild fish populations will be maintained.

Fish group	Fish species
Catfish Pangasiidae	Pangasianodon hypophthalmus
	Pangasius larnaudii
	Pangasius conchophilus
Carps	Barbodes gonionotus
	Leptobarbus hoeveni
	Barbodes altus
Small air breather	Anabas testudineus (perch)
species	Clarias macrocephalus (catfish)
Catfish Bagridae	Hemibagrus wyckioides

Table 1: List of 9 indigenous fish species

4. Environmental Impact Mitigation Plan

4.1 Measures to Mitigate the Environmental Impacts

17. This section sets out the key principles of the Environmental Management Plan (EMP) and includes measures to address all potential impacts listed above; it will be implemented during subproject implementation by contractors. More specifically, construction works contracts will include in the Technical Specifications contractual clauses (Annex 1) on environmental protection, and the Mitigation Plan (Annex 2) as well as the Monitoring Plan (Annex 3) will be attached to these Technical Specifications.

18. During the construction period, the FiA Component Management Unit (CMU) will monitor the implementation of the EMP, particularly measures related to the construction. CMU will assign construction supervision consultant firm (CSC). The Design Consultants will ensure that all relevant issues are adequately addressed at the design stage, and the Employer will ensure that the contract document includes the relevant clauses. The Contractor that will perform the civil works will also follow the requirements of the current related regulations. The Consulting Firm that will assist the FiA CMU in overall subproject management will also assist FiA CMU in the supervision of environmental and social aspects. The CSC/field engineer will supervise the construction works. Compliance with the RGC regulations and the terms of the present EMP will be monitored and verified in the monthly reports submitted to the FiA CMU by the CSC/field engineer, based on consultations with contractors and site visits. Also, the CSC/field engineer will also look into any new critical issues that may come up during the civil works and suggest actions for various agencies.

19. Annex 2 sets out the particular mitigation measures during the construction period. Such measures include aspects to: (a) mitigate risks of erosion and sedimentation around watercourses; (b) restrict water and soil contamination on work sites and around work camps (including littering and waste disposal); (c) restrict generation of dust during construction; (d) reduce risk of fire, cutting of trees for firewood, and trapping by construction workers; and, (e) minimize risk of accidents and ensure occupational safety of workers at construction sites.

20. Implementation of standard impact prevention or mitigation measures through adopting normal engineering practices will ensure that: (a) adequate temporary and permanent drainage is constructed; (b) the faces of embankments become stabilized and planted to prevent erosion;; and (c) tree planting and landscaping. Also, in case of finding any rare/endangered (mammals, birds and fish) species during the construction activities, the present EMP prompts the contractor to inform the wildlife authorities.

21. Annex 2 also sets out the mitigation measures during the operational period. Such measures include to: (a) manage chemicals used for control of parasite; (b) avoid the loss of genetic variability; (c) manage solid waste and discharged water; (d) treat wastewater; and (e) control labor accident risk.

22. Implementation of standard impact prevention or mitigation measures through adopting normal engineering practices will ensure that: (a) health risk due to use of chemicals is eliminated; (b) waste is properly collected and treated to avoid environment pollution and health impact ; (c) genetic integrity of the wild fish populations is maintained; and (d) labor accident risk is controlled. Detailed mitigation measures for above-mentioned issues are described in details in Annex 2.

4.2 Environmental monitoring and supervision

23. A monitoring tool has been designed to cover all aspects of construction, including borrow pits and site management to mitigate erosion and siltation, as well as control of pollution and wastes at work sites and camps. There will be day-to-day supervision of earthmoving and construction works to ensure there is sound environmental practice employed during the contract period. Regular subproject reports shall simultaneously be shared with relevant Cambodian authorities (e.g., MoE, CNMC).

24. All such environmental and social measures will be monitored and enforced, together with health and safety measures (accident prevention, etc.) applied by the contractor for his workforce. It is a part of the EMP that the CSC/field engineer conduct a quarterly subproject audit of the EMP to: a) ensure it is up to date and relevant to the situation on the ground; b) to ensure that non-compliance and corrective actions are appropriately documented; c) to review training inputs; d) to review emergency procedures and implementation status; and, e) to evaluate corrective responses of the contractor.

25. Environmental monitoring and supervision will be integrated into the project management and reporting system. Relevant Government authorities will be involved in auditing subproject performance and will receive copies of monitoring reports. There are no significant environmental risks or subproject negative social impacts which will not be accounted for through implementation of the EMP. Annex 3 summarizes the proposed monitoring activities under the subproject and specifies the parameters to be monitored, location of the monitoring sites, frequency and duration of monitoring. Overall, two types of monitoring reporting is suggested: (i) monitoring on work progress, and (ii) environmental compliance monitoring.

4.3 EMP Implementation Arrangement

26. While the CNMC will be the executing agency for the M-IWRMP, the FiA CMU, which is the implementation agency for Component 1, will implement the subproject, and will maintain files including copies of all contracts and environmental permits. The FiA CMU will designate a liaison officer for environmental protection and mitigation for the subproject and compliance with EMP requirements.

27. The Contractor will be responsible for compliance with environmental covenants as indicated in the contract. In the case of chance finds the contractor must immediately stop work (until resolution has been obtained) and notify the project manager who would immediately notify the FiA CMU. The FiA CMU would further notify the appropriate Government or local authority within 24 hours. The appropriate Government body notified would undertake necessary actions to record the findings and determine mitigation requirements within seven working days.

Community/agencies	Responsibilities
CNMC	 CNMC is responsible for overall monitoring and reporting on the project safeguards policy compliance As part of the periodical reporting, the safeguards compliance shall be compiled by the CNMC as the project owner, which will submit the report to the Bank once every six months and the MOE once every three months
FiA CMU	 FiA CMU is responsible for the maintenance and operation of the hatchery as well as for the overall monitoring and reporting on the subproject EMP implementation FiA CMU may hire an environmental consultant to assist in monitoring and supervising of the subproject EMP implementation FiA CMU is responsible for preparing the quarterly monitoring reports to submit to CNMC and provincial department of environment
CSC and/or Field engineer	• The CSC/field engineer on the site will assist FiA for monitoring the environmental aspects of the project during implementation. The CSC/field engineer will explain to the contractors their responsibilities in meeting the mitigation plans included in the contract. The CSC/field engineer will play a major role in monitoring. He will be responsible for: (i) providing to the FiA a monthly monitoring report of the implementation of the EMP till the completion of the work; and (ii) taking timely measures in case of noncompliance of suggested EMP measures including indication of any variances from the EMP, any chance finds, and specific mitigation actions that have been taken or need to be taken.
Contractor	 Take actions to mitigate all potential negative impacts in line with the subproject EMP Actively communicate with local residents and take actions to prevent disturbance during construction. Ensure that all staff and workers understand the procedure and their tasks in the environmental management plan. Report to the FiA on any difficulties and their solutions Report to local authority the subproject manager if environmental accidents occur and coordinate with agencies and key stakeholders to resolve these issues
Local authority and community	 Participate in the process of subproject preparation and ensure that their views are taken into account Monitor contractor's activities in terms of safeguards policies compliance Report problems to CSC/field engineer Provincial Department of Environment will be responsible for inspecting the hatchery operation

Table 2: Responsibility for subproject EMP implementation

28. Conclusions and recommended steps to ensure that the EMP is implemented are as follows:

- To ensure that contractors pay attention to environmental impact mitigation, the EMP will be included in the Technical Specifications of the contract.
- To ensure the contractors understand the actions to be taken and the cost implications of environmental management and to ensure that required actions and measures are priced in bid proposals, the pre-bidding meetings will discuss the EMP.
- Once the contract is signed, the Contractor will be briefed on environmental management by the Employer explaining impact prevention/mitigation, the EMP included in their contracts, and the environmental monitoring to be implemented.
- The CSC/field engineer should report monthly on Contractor performance and progress with regard to EMP compliance

4.4 Capacity development and training

4.4.1 EMP training

29. Training in the EMP will be provided for FiA staff responsible for EMP implementation, contractors, CSC and/or Field engineer and local authority during subproject implementation. This is to ensure that: (a) the proposed subproject activities will be adequately screened; (b) mitigation measures are included in the bidding documents and contracts and supervision and monitoring of the contractor performance is conducted by FiA and/or its environmental consultant; and (c) close consultation with local agencies and communities is carried out throughout subproject planning and implementation. The cost estimate of this training is US\$15,000 and included in the cost of project safeguards training.

4.4.2 Hatchery operation training

30. Training is very important for the successful of the hatchery operation. Since there is no hatchery in Stung Treng before, all staffs are needed to be trained before and during the operation of the hatchery. The cost estimate of this training is US\$30,000 and included in operation cost. The training should be divided into 3 categories as follows:

- Training for the hatchery manager
- Training for Fisheries Biologists
- Training for the farmers

4.4.2.1 Training for the hatchery manager

31. The hatchery manger should be a person with experience in fish breeding and fish culture, with managerial qualities. He/she will be responsible for the overall technical, financial and organizational management. Training needed for this position are fish production programming, hatchery management, financial planning and budgeting, and personnel planning. The training should be conducted before the operation of the hatchery.

4.4.2.2 Training for Fisheries Biologist

32. The Fisheries Biologists will responsible for fish breeding, nursing and culturing. They needed to know all aspects of fish breeding, nursing and culturing. Several training courses are needed for these people. There includes:

- 1. Fish breeding
- 2. Fish nursing
- 3. Fish culture
- 4. Fish feed and feeding
- 5. Fish disease
- 6. Water quality
- 7. Moina production
- 8. Hatchery management
- 9. Fisheries extension

33. These trainings should be done during the construction of the hatchery before the operation of the hatchery. The training can be done in locally in Cambodia or in the MRC Fisheries Programme riparian countries like Thailand or Vietnam, under the cooperation with the Fisheries Programme.

4.4.2.3 Training for fish farmers

34. Since fish culture is very new to the area, farmers should be trained on several aspects of fish culture through extension programme. The training for farmers can be divided into 2 categories i.e., training for small hatchery operation and training for fish culture. The hatchery owners should be trained on fish breeding and fish nursing including fish feed preparation, fish disease and pond preparation. While fish aquaculture farmers should be trained on fish culture, fish feed preparation and fish disease. These trainings will be carried out by the provincial hatchery staffs from the second year of the hatchery operation.

4.5 Public consultation and information disclosure

35. The impacts due to construction of the hatchery will be discussed with the local authorities, the local community and independent organizations operating in the subproject area of influence. The approach used shall include group discussions and observations during subproject site visits. Routine consultations should be planned during the stages of the subproject (detailed design prior to commencement of construction and during construction).

36. In line with the World Bank policy on Access to Information and OP 4.01 (Environmental Assessment) FiA provided a summary of the proposed subproject's objectives, description, and potential impacts and mitigation measures for groups being consulted prior to consultation on 25 and 27 March 2014 to ensure that they have sufficient time to review and contribute their views during consultation – the minutes of consultation is attached to this report in Annex. The final EMP will be disclosed to the public through the website of FiA and Stung Treng Province in local language. Hard copies of the final EMP will be made available in the commune office accessible to the key stakeholders.

5. References

- 1. Cambodia Law on Environmental Protection and Natural Resources Management
- 2. Cambodia Law on Fisheries
- 3. Cambodia Law on Labour
- 4. Cambodia Law on Protection of Cultural Heritage
- 5. Draft Feasibility Study for Stung Treng Hatchery
- Environmental and Social Management Framework for the Mekong Integrated Water Resources Management Project Phase 3
- 7. Sub-decree on Solid Waste Management (No.36ANRK.BK)
- 8. Sub-decree on the Control of Air Pollution and Noise Disturbance (No.42 ANK.BK)
- 9. Sub-decree on Water Pollution Control (No.27 ANK.BK)

6. Annex 1: Contract Provisions

The Technical Specifications of the Contract will include the following provisions on Environmental Protection.

This section describes the environmental mitigation requirements to be followed by the Contractor and measures to be carried out by the Contractor related to environmental protection. Contractors shall follow all RGC laws and regulations related to environmental protection. Additionally the Contractor shall provide an environmental mitigation and monitoring plan in connection with the submission of the Program based on the provisions of the Environmental Management Plan prepared during subproject preparation and set forth in these Technical Specifications. The Engineer may interrupt the Contractor's work, if the provisions of the approved environmental plan are not followed. The Contractor shall also nominate one of his senior staff members to be responsible for follow-up of the implementation of the provisions of the environmental plan as well as for the guidance of the rest of the staff and reporting to the Engineer. The environmental monitoring and management plan shall be provided as a part of the works required by of these Technical Specifications.

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.

Health, Safety and Accidents

The Contractor shall ensure, so far as is reasonably practicable, the health, safety and welfare at work of his employees including those of his sub-contractors and of all other persons on the Site. The organization of the construction sites and work places shall generally be in accordance with the existing safety regulations in Cambodia. His responsibilities shall include:

(a) The provision and maintenance of construction plant, equipment and systems of work that are lighted, safe and without risks to health.

(b) The execution of suitable arrangements for ensuring safety and absence of risks to health in connection with the use, handling, storage, transport and disposal of articles and substances.

(c) The provision of protective clothing and equipment, first aid stations with such personnel and equipment as are necessary and such information, instruction, training and supervision as are necessary to ensure the health and safety at work of all persons employed on the Works all in accordance with the Laws of Cambodia.

(d) The provision of a qualified officer or designation as Safety Officer of one of his senior staff who has specific knowledge of safety regulations, and experience of safety precautions on similar works and who shall advise on all matters affecting the safety of workmen and on measures to be taken to promote such safety.

(e) The provision and maintenance of access to all places on the Site in a condition that is safe and without risk of injury.

(f) The provision of adequate waterborne sanitation, refuse collection and disposal, complying with the Laws of Cambodia, all local by-laws and to the satisfaction of the Engineer, for all houses, offices, workshops and laboratories erected on the camp site or sites.

(g) The provision of an adequate number of suitable latrines and other sanitary arrangements at sites where work is in progress to the satisfaction of the Medical Officer in the area.

(h) The execution of appropriate measures in consultation with the appropriate Public Health Authority to control within the Site, including the camp sites, mosquitoes, flies and pests including the application of suitable chemicals to breeding areas.

(i) Reporting details of any accident to the Engineer and the Police, if appropriate, as soon as possible after its occurrence.

The Contractor shall appoint one responsible member of his staff to act full-time as Safety Officer, and he shall notify the Engineer of such appointment. The Safety Officer shall be experienced in all matters relating to health and safety on Sites and shall be familiar with all relevant safety regulations and legislation. The Safety Officer shall have the power to receive instructions from the Engineer on matters relating to the health and safety of personnel on Site and the safe conduct of site operations. The Safety Officer shall organize and all workmen shall be required to attend an orientation/safety induction course within their first week on Site.

Protection of Water Resources

(i) During construction, the contractor shall carry the full administrative and legal responsibility for any pollution of surface waters according to the existing legislation.

(ii) The contractor shall ensure that no oil products, fuel, lubricants, detergents, paint or other harmful substances are introduced into streams and irrigation or drainage facilities.

(iii) The storage of wastes or production waste as well as filling and parking of machinery or cars is not permitted within a distance of 100 m of any stream including drainage or irrigation facilities. The discharge of oil and fuel onto open soils is prohibited. Filling of any machinery shall be restricted to stationary and or mobile filling stations and shall exclusively be carried out by using suitable taps or nozzles. The contractor shall make all necessary arrangements to ensure that pollution of soils and groundwater will be avoided as far as possible.

(iv) The contractor shall submit a plan to the relevant authorities indicating the type of installation and their respective locations e.g. fuel and material storage, stationary filling sites, asphalt plant, mixing plant, car wash facilities etc. For each installation the contractor shall indicate the approximate closest distances to irrigation and drainage channels as well as public or private wells. For each installation beforehand the Contractor shall indicate in written form to the Engineer in addition to the above the approximate closest distances not less than 250 m to the specified green or protected areas.

(v) The Contractor shall submit to the Engineer an emergency plan for hazardous spills and leakage subject for approval before commencement of the works. This does not overrule requirements of the section i) above vi) the direct discharge of sewage from worker's camps into any stream is prohibited. Sewage from these installations shall be collected in septic tanks or soaking pits.

Noise Control

The Contractor shall follow all the existing laws and regulations concerning the noise control in construction works, asphalt plant and borrow pit activities. The contractor shall submit a plan to the relevant authorities indicating the type of installation and their respective locations e.g. asphalt plant, mixing plant etc, which is subject for approval before commencement of the works. The Contractor shall elaborate and adopt effective measures both in management and technology to minimize noise, especially in proximity to residential areas. The contractor should conduct appropriate prior maintenance to minimize the noise-level of equipment. The use of high-level noise generating plant and equipment shall not be carried out at night unless otherwise approved by the Engineer. All noise not relating to the construction shall be avoided as far as possible.

Dust Control

The contractor will specify and follow mitigation measures to control dust from the operation of equipment and construction. If stone crushing operations are undertaken at site, care shall be taken to ensure that any dust emanating from the operations is contained to prevent nuisance to adjoining properties. The Contractor shall submit a plan indicating the proposed routes for material transport and make statements on the proposed method of dust control where transport through settlements cannot be avoided.

Solid waste from construction and construction camps

(i) Wherever possible recycling/re-use of materials shall be considered; (ii) As a rule, solid wastes generated during the construction phase shall be systematically collected, stored and disposed of in suitable locations approved by the subproject manager and in accordance with national and local relevant regulations.

(a) Construction debris shall generally be removed from the site in an orderly manner and disposed of in accordance with the existing regulations. (b) Clean soil material, i.e. later indicated as Spoil Material that is not reusable shall be removed from the site and transported to the soil dumping areas in accordance with relevant regulation, or designated in the design documents. (c) Domestic waste from temporary construction camps shall be systematically collected and hauled to the designated areas in accordance with the relevant regulation. Should construction camps be erected within a reasonable distance to larger settlements, camp's solid waste may be integrated into existing collection and disposal facilities of nearby communities by their approval.

Fire Protection

The Contractor shall comply with the provisions for fire protection according to RGC legislation or as otherwise directed by the Engineer.

Materials

The contractor will restrict the use of materials to sources appropriately licensed under RGC legislation for permits. The contractor will be responsible for having on file evidence of such permits.

Sewage

The contractor will contain, collect, and treat any sewage in accordance with the requirements of environment protection and as approved by the Project Manager and the local department of environmental protection.

Social Issues

The contractor will follow social mitigation actions as indicated in the designs provided for the hatchery. In the case of disputes, the contractor will refer the issue to the subproject manager. Specific concerns include but are not limited to access to residences, source of income generation, and water and other utilities.

Chance Finds

In line with Cambodia law on Protection of Cultural Heritage, when construction work or any other activity bring to light cultural property such as monuments, ruins, ancient objects, remains of inhabited sites, ancient burial sites, engravings or any property likely to be of interest in the study of prehistory, history, archaeology, ethnology, paleontology or other branches of science dealing with the past or of human sciences in general, the person finding the property and the owner of the site where it was discovered are obliged to stop the construction work and immediately make a declaration to the local police, who shall transmit it to the Governor of the province without delay. The Governor shall in turn inform the competent authority and shall take the measures necessary to ensure the protection of the objects and the site.

Supervision and Monitoring

The CSC and/or field engineer will be responsible for monitoring and verifying that all construction is in compliance with the terms of the EMP and that there have been deviations from neither the terms of this contract or the EMP.

Payment

Except when otherwise specified, there will be no payment for actions taken in support of the environmental protection as specified in this section. All costs associated with this task will be considered as being covered by the overall payments specified in the contract for the construction work (bill of quantities). All costs entailed in sampling, testing and in carrying out trial areas for the purpose of environmental protection as set in these Technical Specifications, shall be deemed to be included in the prices and rates entered by the Contractor in the Bill of Quantities.

7. Annex 2: Mitigation Plan

Phase	Issue	Mitigation measures	Cost	Responsibility for implementation	Responsibility for supervision
Pre- construction					
	Site selection	Conduct a screening through careful site investigation with participation of professional experts (e.g., geologist, biologist, archaeologist, hydrologist, etc); Consult with local authority and people; Make sure that problems with UXO, flood, erosion, depression, damage to significant cultural resources, land acquisition and resettlement, loss of biodiversity, etc. to be adequately managed before commencement of detailed design	Preparation cost	FiA CMU	CNMC
	UXO clearance	CMAC will be hired to detect and clear UXO from the hatchery site; CMAC will inform concerned agencies, local authority and people about a detailed plan for detection and clearance of UXO at least one week before work starts	Preparation cost ²	CMAC ³	FiA and CNMC
	Detailed design	Results from screening and hydro- meteorological and geological survey data	Preparation cost	Design consultant	FiA CMU

² US\$ 6,000 will be allocated for UXO clearance ³ The **Cambodian Mine Action Centre (CMAC)** is Cambodia's leading demining organization, working in the key areas of Survey and Land Release, Mine and UXO Clearance, Mine and UXO Risk Education and Training, Research and Development. .

Construction	Construction site	should be taken into consideration at detailed design stage; Detailed design should be reviewed and appraised by the panel of professional experts to ensure that operation of the hatchery station will not face any environmental problem			
	Site clearance	Clearing and grubbing, debris generated due to dismantling of existing road, tree cutting, etc. before the commencement of the construction activities shall be done in accordance with local regulations		Contractor	CSC/field engineer FiA CMU Provincial DoE
	a) Noise disturbance including vibrations	The construction equipment will strictly conform to Cambodia noise standards; Vehicles and equipment used shall be fitted with exhaust silencers and shall be checked regularly; Noisy construction activities will be at least a distance of 100m from the hospitals, educational institutions ect., and 150 m from the nearest habitation; Construction activity should be restricted between 6.0 AM - 7.0 PM near habitations; Workers shall be provided with earplugs; Suitable noise barriers or double- glazing of windows will be provided to the noise sensitive receptors.	Construction cost	Contractor	CSC/field engineer FiA CMU Provincial DoE
	b) Dust/air quality	Water will be sprayed on earthworks, temporary haulages and detour roads to prevent dust generation; Vehicles delivering fine materials like sand and fine aggregate shall be covered to reduce spills on roads; The asphalt plants, crushers will be sited at least 1 km in the downwind direction from the nearest human	Construction cost	contractor	CSC/field engineer FiA CMU Provincial DoE

	settlement; It shall be ensured that the dust emissions from the crusher and vibrating screen at the stone quarries are within the emission standards.			
c) Traffic disruption during construction activity	Traffic management plan with appropriate measures and signaling system to redirect traffic that are easily seen or easy to follow.	Construction cost	Contractor	CSC/field engineer FiA CMU Provincial DoE
d) Vehicle and pedestrian safety when there is no construction activity	Traffic management plan with appropriate fencing, lighting and well defined safety signs.	Construction cost	Contractor	CSC/field engineer FiA CMU Provincial DoE
e) Soil erosion	Control soil erosion/sedimentation through use of dikes, fiber mats, mulches, grasses, slope, drains and other devices	Construction cost	Contractor	CSC/field engineer FiA CMU Provincial DoE
f) Quarries, sand & borrow pits	Only licensed quarries and borrow sites will be used; precaution will be required to prevent the spillage of materials during transportation; all vehicles will be covered to avoid spillage during transportation of quarry materials.	Construction cost	Contractor	CSC/field engineer FiA CMU Provincial DoE
g) Drainage and flood hazard	All the existing flowing water bodies (rivers, streams, canals including irrigation canals) hazard are provided with culverts to maintain the natural drainage of the area	Construction cost	Contractor	CSC/field engineer FiA CMU Provincial DoE
h) Water and soil pollution from improper material storage, management and usage	Organize and cover material storage areas; isolate concrete, asphalt and other works from watercourse by using sealed formwork; isolate wash down areas of concrete and asphalt trucks and other equipment from watercourse by selecting areas for washing that are not free draining directly or indirectly into watercourse.	Construction cost	Contractor	CSC/field engineer FiA CMU Provincial DoE
<i>i)</i> Water and soil pollution from	Dispose waste material at appropriate location protected from washing out, specified by local	Construction cost	Contractor	CSC/field engineer FiA CMU

improper disposal of	authorities.			Provincial DoE
waste materials	Some 17,672 cubic meters of excavated soil will			
	be generated from digging fish ponds. A large			
	part of this soil will be used to (1) build the			
	dikes at 0.5-2 m above the ground level, (2) to			
	raise the floor of the buildings and the road at			
	the same level as the ponds dikes and (3) to add			
	1 m to the surrounding dike of the station. The			
	latest will be 740 m in length by 1.5-3 m final			
	height and 1 m final width at the top; it might be			
	useful for reducing more the risk of flooding. On			
	the whole, 12,679 m ³ of soil will be used for			
	those dikes arrangements, which is equivalent to			
	71.7% of the digged volume of soil. Therefore			
	about 30% of soil might remain; it could be			
	given or sold in the surroundings			
<i>j)</i> Potential	Proper handling of lubricants, and solvents by	Construction	Contractor	CSC/field engineer
contamination of	secured storage; ensure proper usage of	cost		FiA CMU
soil and water from	construction equipment; collect all waste and			Provincial DoE
improper usage of	dispose to permitted waste place			
construction				
 equipment				
k) Air pollution from	Maintain construction equipment to good	Construction	Contractor	CSC/field engineer
improper	standard, improper functioning machinery that	cost		FiA CMU
maintenance of	causes excessive pollution will be banned from			Provincial DoE
 equipment	the construction site.			
l) Workers safety	Provide workers with safety instructions and	Construction	Contractor	CSC/field engineer
	protective equipment; safe organization of	cost		FiA CMU
	bypassing traffic			Provincial DoE
m) Archeological	All archeological property found during works		Contractor	CSC/field engineer
Chance finds	should be dealt with according to the local rules			FiA CMU
	and regulations. In the event of the unexpected			Provincial DoE

		discovery of archeological objects the Contractor should immediately inform the CSC/field engineer and the local and archeological authorities and follow their			
		directions.			
Construction	Worker's camp site conditions				
	<i>a)</i> Cleanliness, solid waste handling and disposal facilities, drainage conditions	Provide workers with (a) clean water, (b) mobile toilets, and (c) garbage bins; Avoid ponding at construction sites as mosquito habitats; Avoid blocking water flows by designing appropriate culverts; and Apply environmentally sound measures to	Construction cost	Contractor	CSC/field engineer FiA CMU Provincial DoE
Oneration		control mosquitos, rats, mes and other pests			
	Quality of source water (i.e. Sekong river) - The quality of source water can also have a major effect on the viability of an aquaculture operation	Water quality will be tested and further treatment may be required to ensure that the quality meets specific purposes of the hatchery operation and is in accordance with national technical regulation (i.e. Sub-decree on Water Pollution Control (No.27 ANK/BK))	Operation cost	Provincial FiA	FiA
	Fish escape	Though the proposed species produced by this provincial hatchery are mainly indigenous fish species that occur in the area, prevention of escapee should be aware. It is recommended that all the pond inlets and outlets should be blocked with screening sleeve made of synthetic net. Furthermore, the inlet and outlet canals should also be blocked with the same type of net		Provincial FiA	FiA
	Chemicals	The main function of the hatchery is fingerling	Operation	Provincial FiA	FiA

mana	nagement	production and this activity will operate at semi- intensive level. Thus there is no need to use any antibiotic or pesticide. However, during the incubation and nursing period especially in the winter there might be some problem with parasite. This can be controlled by using only Sodium Chloride (NaCl). None of toxic chemicals is allowed in operation of the hatchery.	cost		Provincial DoE
Was	stewater	To prevent the problem of aquaculture wastewater, the hatchery has been designed with a water treatment pond. This pond will receive water from hatchery, cement tanks, broodstock ponds and nursing ponds. The capacity of this pond is 1,956 m3, equivalent to 4 nursing ponds. The remaining nutrients will be stripped off the water through the natural food web or wet land system. Afterwards the water will be sent back into the reservoir for recycling. On the other hand, all wastewater from house and office should be treated using the water treatment tank (septic tank). A monthly monitoring of wastewater discharge meets national standard requirements.	Operation cost	Provincial FiA	FiA Provincial DoE
Solid	id waste	As the staff will stay in the hatchery (8 people) household waste will generate during the operation of the hatchery. Since the solid waste collection does not cover the hatchery area, the hatchery staff will establish a dust bin and the collected solid waste will be carried to the nearest collection point every week.	Operation cost	Provincial FiA	FiA Provincial DoE

	During the exerciseral named addiment will	Onenation	Drozvin si sl E' A	E: A
	During the operational period, sediment will	Operation	FIOVINCIAI FIA	FIA Dravin sial DaE
	accumulate and the natchery needs to be cleaned	cost		Provincial DoE
	from time to time (semi-annually) by operation			
	unit under F1A. The amount of the sediments is			
	not large (less than 1 cubic meter per year) and			
	can be disposed in a temporary designated area			
Sediment disposal	within the hatchery. A large part of the nutrients			
Sediment disposar	accumulate into the sediments. Therefore, the			
	sediment periodically removed from the bottom			
	could be spread on the embankment of the			
	ponds and used for gardening. The sediment			
	could be also spread as fertilizer onto the paddy			
	fields. FiA will conduct a sample analysis every			
	year to confirm no toxic materials.			
	Staff and workers operating the hatchery station	Operation	Provincial FiA	FiA
	should be (i) annually trained in labour safety	cost		
	rules and first aid and (ii) provided with labour			
	safety tools:			
	<i>y</i>			
	The Hatchery manager should follow Cambodia			
	law on Labour:			
Occupational health	The hatchery station should be provided with			
and safety	qualified first-aid kits and fire-extinguishers at			
	all times.			
	Unauthorized persons are prohibited to enter the			
	hatchery station.			
	nuclicity station,			
	Dangerous area if any should be provided with			
	a warning signhoard			
	a warning signboard			

8. Annex 3: Monitoring Plan

Environmental monitoring during subproject implementation would provide information about key environmental aspects of the subproject, particularly the environmental impacts of the subproject and the effectiveness of mitigation measures. Such information enables the FiA and the Bank to evaluate the success of mitigation as part of subproject supervision, and allows corrective action to be taken when needed.

The monitoring plan will be undertaken by FiA to (i) ensure that construction contractors are compliant with this EMP. FiA may also hire an environmental consultant to assist to monitor and supervise the EMP implementation. Field engineers and/or construction supervision consultants will help FiA to monitor contractor's compliance with environmental covenants. Local authorities and communities are encouraged to participate in monitoring program.

Ministry of Environment will also undertake the responsibility for monitoring in accordance with the Law on Environmental Protection and Natural Resources Management.

Monitoring of ambient environmental quality is developed based on foreseen environmental impacts that may cause changes in noise level, air and water quality in the subproject site. These results would help FiA and MoE to evaluate the degree of impacts due to the subproject implementation and effectiveness of implementation of mitigation measures.

Details about the monitoring program are given in the following table.

Phase	What parameter to be monitored?	Where parameter to be monitored?	How parameter to be monitored?/type of monitoring equipment	When parameter to be monitored? (frequency of measurement or continuous)	Cost	Responsibility for monitoring
Pre-construction						
a) Detailed design	Technical specifications		Review and appraisal by the panel of experts	Before commencement of construction	Subproject preparation cost	FiA CMU
Construction						
a) Noise disturbance and vibrations	a) noise levels (dB); sonometer	a) At and near work site	a) Inspection and supervision; according to Cambodia noise standards	a) once a month or on complaint	Included in subproject cost	CSC/field engineer FiA CMU MoE
b) Dust/air quality ⁴	 TSP (24 hours average) CO, NO₂ and SO₂ (1 hour average) 	b) At and near work site	b) inspection	b) once every 3 months; unannounced inspections during material delivery and construction	Included in subproject cost	CSC/field engineer FiA CMU MoE
c) Traffic disruption during construction activity	c) existence of traffic management plan; traffic patterns	c) At and near work site	c) inspection; observation	c) before works start; once per month at peak and non-peak periods	Included in subproject cost	CSC/field engineer FiA CMU MoE
d) Vehicle and pedestrian safety when there is no	d) visibility and appropriateness	d) At and near work site	d) observation	d) once per month in the evening	Included in subproject cost	CSC/field engineer FiA CMU MoE

Table 3: Monitoring Plan

⁴ Technique and standard applicable to monitoring plan is in accordance with Sub-decree on the Control of Air Pollution and Noise Disturbance (No.42 ANK/BK)

construction activity						
e) Soil erosion	e) Turbidity	e) At work site	e) Visual observation by Supervisor	e) Construction stage	Included in subproject cost	CSC/field engineer FiA CMU MoE
f) Quarries, sand & borrow pits	f) Possession of official approval or valid operation license	f) Quarry, sand & gravel borrow pits	f) inspection	f) Before work begins	Included in subproject cost	CSC/field engineer FiA CMU MoE
g) Drainage and flood hazard	g) Execution of work according to design	g) At work site	g) inspection	g) During construction	Included in subproject cost	CSC/field engineer FiA CMU MoE
h) Water and soil pollution from improper material storage, management and usage	h) water and soil quality (suspended solids, oils, pH value, heavy metals)	h) runoff from site, material storage areas; wash down areas of equipment	h) inspection; observation	h) during material delivery and construction, especially during precipitation (rain, , etc.)	Included in subproject cost	CSC/field engineer FiA CMU MoE
i) Water and soil pollution from improper disposal of waste materials	i) water and soil quality (suspended solids, oils, pH value)	i) depository site	i) inspection; observation	i) once every 3 months during construction and on complaint	Included in subproject cost	CSC/field engineer FiA CMU MoE
j) Potential contamination of soil and water from improper maintenance of equipment	j) water and soil quality (suspended solids, oil, lubricants, fuel, pH value	j) At work site; construction equipment place	j) unannounced inspection	 j) once every three months during construction, on complaint, and in case of spillage 	Included in subproject cost	CSC/field engineer FiA CMU MoE
k) Air pollution from improper maintenance of	k) Exhaust fumes, dust	k) At work site	k) Visual inspection during work	k) During work	Included in subproject cost	CSC/field engineer FiA CMU MoE

equipment (asphalt plant and machinery)						
l) Staff safety	l) protectiveequipment;organization ofbypassing traffic	1) At work site	1) inspection	l) unannounced inspections during work	Included in subproject cost	CSC/field engineer FiA CMU MoE
Construction	Worker's camp site conditions					
a) Overall workers' camp site conditions	a) Cleanliness, solid waste handling and disposal facilities, drainage conditions	a) On the camp site during construction activities	a) Unannounced inspection	f) According to the existing regulations	Included in subproject cost	CSC/field engineer FiA CMU MoE
Operation						
Wastewater ⁵	pH, BOD ₅ , COD, TSS, ⁶ NO ₃ ⁻ , PO ₄ ³⁻ , NH ₃	water outlet of the hatchery station	Inspection	Once every three months	Operation cost	FiA MoE
Surface water (Sekong River water)	pH, BOD ₅ , Suspended Solid (SS), Dissolved Oxygen (DO), Coliform	Water intake	Inspection	Once every three months	Operation cost	Provincial FiA
Fish escape	Screening sleeve made of synthetic net	Pond inlet and outlet of the hatchery station	Observation	Daily		Provincial FiA
Chemicals management	List of chemicals used for control of parasite	The hatchery station	Review the list and check	Once every six months	Operation cost	FiA MoE

⁵ Technique and standard applicable to monitoring plan is in accordance with Sub-decree on Water Pollution Control (No.27 ANK/BK) ⁶ TSS – Total Suspended Solids; BOD – Biochemical Oxygen Demand; COD – Chemical Oxygen Demand

Solid waste	Proper collection	The hatchery	Observation	Once every six	Operation cost	FiA
Sona waste	and disposal	station		months		MoE
	Proper collection	The hatchery	Observation	Once every six	Operation cost	
Sediment disposal	and disposal	station		months		FiA
						MoE
Occupational	Training and	The hatchery	Interview of staff	Once a year	Operation cost	FiA
boolth and safety	awareness	station	and workers and			
health and safety			overseeing practice			

9. Annex 4: The minutes of consultation on 25 and 27 March 2014 in Kratie and Stung Treng provinces

1. Introduction

The Consultation Workshops were conducted in two provinces of Kratie and Stung Treng on March 25 and March 27, 2014. There were 85 participants, 16 were from the Civil Society Organizations (CSOs), 5 from Provincial Fisheries Offices, and 55 from the fisheries communities (CFs) in both provinces. There were also 4 participants from Inland Fisheries Research and Development Institute (IFReDI) - Fisheries Administration and 5 from the World Bank in Phnom Penh.

The purpose of the workshop is (i) to disclose the project's information including safeguardsrelated documents prepared by the Fisheries Administration (FiA) to the concerned stakeholders namely the CSOs and FCs, (ii) to raise awareness on the project intervention among the direct and in-direct beneficiaries, (iii) to collect any lesson learned about success and failure of FCs and integrated water resource management, and (iv) to discuss how to sustain them.

This workshop is an addition to the previous workshops which were conducted in the same provinces in December 2013 for the government officials, local authorities, some FCs, and some CSOs. The main audience of this workshop was the FCs and civil society representatives who did not attend the previous workshops.

The workshop began with a welcome remark by Veasna Bun, Senior Infrastructure Specialist of the World Bank in Cambodia and followed by three presentations at each workshop. In Kratie province, Mr. Touch Bunthang, Chief of Biodiversity of Fresh Water Fisheries Research and Development Institute of FiA, presented the objectives of the workshop and the project objectives and scope; Mr. Heng Kong, World Bank Consultant presented the Hatchery Construction Plan and Environmental Management Plan; and last presenter was Mr. Sam Sovan, Executive Director of NRD (Northern Rural Development). He presented the NRD works and supports FCs as well as the success and failure of the FCs in Kratie Province. In Stung Treng province, the same presentations had been given, except the NRD which was replaced by Mr. Peak Saven who is a representative of My Village Organization. Mr. Peak presented My Villages activities in Stung Treng Province.

Mr. Bun highlighted the importance of the additional Consultation Workshops with Civil Society Organizations and the FCs in the two provinces to further share the project objectives and intervention with the relevant stakeholders and collect more information regarding fisheries resources and water resource management in these two provinces. He also underscored the benefit of the project to improve the livelihood of the people live along the Mekong and beyond. Of course, socio-economic development would have direct and indirect impact on water resources and related water resources such as fisheries, he said. He added that sustainable fisheries and water resources management requires active participation of all stakeholders and today workshop is one of a form of participation in the project. He finished his remark by encouraging participants to share their ideas what works well and what need to be done differently for the benefit of the project and for benefit of the communities.

2. Presentation

Mr. Touch Bunthang presented the project objective

Several questions were raised in both workshops. Those questions are: period of project preparation, measurement of fish population, way of supporting FCs, and the definition of success FCs. In response, Mr. Chheng Phen, Deputy Director of IFReDI – Fisheries Administration said that the project preparation takes quiet long time due to a slowdown in relationship between the Government and the World Bank. The World Bank needs to solve some problems such as Boeung Kak Lake issue.

Regarding measurement of fish population, Mr. Phen responded by saying that project will strengthen 114 FCs including official registration of new FCs, preparation of fisheries community management plan, and additional work such as fish cultivation and animal raising. He also encouraged all stakeholders to support project when it's implemented. Without them the project is hardly to achieve its goal. He also emphasized that project will benefit not just only for the people who live along the Mekong River, but beyond. So, well manage of fisheries and water resources is so important and this project can help.

Regarding history of the project, Mr. Bun responded by saying that the project preparation actually started in 2008 with around \$200 million financial support for countries in the Mekong River basin. Phase I, he said, the project provided financial support to MRC for regional integrated water management including trans-boundary facilitation and dialogue with upper Mekong countries. It also supported the development of Water Law in Lao PDR and fisheries management in the country. Phase II, the project supports Vietnam government to manage water resources in central Vietnam and the Mekong Delta water resource management. Phase III, the project will support Cambodia to strengthen FCs in two provinces - Kratie and Stung Treng and integrated water resource management in four provinces of Ratanakiri, Mondulkiri, Kratie, and Stung Treng.

Mr. Phen said that FCs have been established several years ago. However, there are only several succeed. He identified success when the fisheries community has a proper capacity to run it and has a proper management plan.

Heng Kong presented Hatchery Plan and Environmental Management Plan to the participants in both workshops.

Several questions have been asked. Those are: the decision of the location of the hatchery site, the distribution of fingerling, the impact of the build hydropower along the Mekong and its tributary, and the impact of farmers who are now doing hatchery for sale.

The location for hatchery was selected based on the suitable site for the some endangered fish species like *Pa Sa E*. About nine indigenous fish species will be bred at the Hatchery. Fingerling will be released to natural lakes or rivers for the public benefit and distribute or sell to farmers who really want to cultivate them. The hatchery will pilot the pound to show the interested farmers and will provide training to them. Distribute free of charge to farmers has a bad experience.

Som Sovann presented NRD's work on FCs in Kratie Province.

Pheak Saven, representative from My Village Organization shared its interest work in the field of deep pool conservation. He discussed the success, challenges, and lesson learned of his organization work.

Mr. Saven also highlighted some aspects that could lead to sustainable development in FCs. Those aspects are: get villagers well understand about how important of natural resources to their daily lives, they are the owners of the resources, build trust among their members, and generate more income for the communities.

3. Group Discussion

At each workshop, after lunch, the participants were divided into two groups to discuss two main questions—What's work and what's does not work of FCs/integrated water resources management and what would be the success of fisheries community/integrated water resources management and livelihood ? All communities fisheries representatives were put in one group I and all Civil Society Organizations were put into another group. These two groups discussed the same questions as mentioned above in both workshops.

Each group was given 70 minutes for the discussion and 15 minutes for presenting their results. Below is a combine results.

Fisheries Community Group:

Success:

- Regular meeting between the committee members
- Regular patrolling
- Good collaboration with local authorities and specialized agencies
- Active participate from members
- Establish by-law and internal regulation for communities
- Dissemination of Fisheries law
- Support from relevant institutions and NGOs
- Good gender participation (Fisheries Law dissemination and take part in combating illegal fishing such as reporting the illegal fishermen)
- Use media to report illegal issue

Failure/challenges:

- Some authorizes are involving in illegal fishing
- Lack of financial support
- Poverty
- Lack of collaboration from authorities.
- Lack of fully participate from villagers
- Lack of Fisheries Law enforcement from local authorities
- Lack of mean (boat, machine, gasoline, Life Jacket, Rain coat, light, camera, hammock, walkie-talkie)
- Irregular meeting between the members and network (People lack of awareness)
- Limitation of participation from the local authorities
- Threat from illegal fishermen (Threaten to kill or cause danger)

Sustainable:

- Full participation from local authorities and experts (No upset, no disappointment)
- Members of Communities well understand of Fisheries Law
- Provide financial support
- Provide more training
- Support for study tour
- Create additional jobs for the members/farmer such as fish cultivation, pig, chicken, duck raising, vegetable growth to reduce over fishing of natural fish (Generate more income. If there is no income, we cannot treat it as success)
- Create saving group to reduce the interest rate charge by other financial micro-credits and banks
- Have enough mean
- Food processing and create job for communities (fish production)

Group Civil Society Organization:

Success:

- Good collaboration with authority
- Participate from villagers volunteer
- Form ranger, regularly patrol, report illegal activities
- Support from development partners
- Build good partnership and capacity building for the communities
- Co-manage of preservation of the deep pool
- Have management plan and monthly planning of the committee
- Official registration at the MEF
- Insert community development plan in the commune development plan
- Establish saving group and food and other processing
- Form self-help group for fish cultivation and pig raising

Failure:

- Conflicting view in implementation of the community development plan
- Conflict over the interest of FCs
- The impact of the political and economic crisis
- Some authorities involve in illegal fishing
- Lack of prioritize from the local authorities in term of fisheries
- Lack of financial
- Lack of broadly dissemination of legal/fisheries law

Sustainable:

- Develop a clear management plan
- Build capacity for the community members
- Strengthen the collaboration between the relevant agencies
- Broadly disseminate the Fisheries Law
- Establish monitoring group
- Prepare business plan, create more jobs
- Provide capacity and knowledge and technical to fisheries community members and government staff
- Establish small enterprise
- Prepare for exit strategy (Study tour, training, and see any potential for sustainable of the communities, active saving and build trust among the members)
- Include the FCs' management plan into the commune development plan.

4. Plenary discussion

The workshops also opened for plenary discussion. In addition to the result of their group, several participants shared their success in managing their FCs as well as sustainability. A Fisheries Community representative pointed out that his community is running well because it has self-finance. They make income from establishing eco-tourism, including home-stay, sell souvenir and other services for tourists. He hopes some FCs could take it as example. Another community representative pointed out that some FCs established saving group. Few participants from Civil Society groups supported the activities that have been done by the communities in order to sustain their communities. They also add that FCs' management plan should be included in the commune development plan. They also raised that the most important way to sustain is to create income for the communities, to help them to understand

that the resources are belong to them, and to build trust among their members. However, some participants acknowledged that community still face with lack of both capital and human resources. There is no sufficient support to communities in term of technical support such as fish cultivation and chicken, duck, or pig raising. They also acknowledged that the majority of communities are uneducated.

5. Closing

Mr. Veasna Bun captured three main take –away messages for success of FCs. First, he said, good collaboration among fisheries officials and FCs; second, community members have been empowered to take action for community development including combat illegal fishing; and third, FCs have good collaboration with local authorities such as village leaders, commune council members, and district authorities. He encouraged the fisheries officials to work closely with the civil society groups to capture good lesson learned (what's work and what's doesn't work) and to develop good sustainable development plan for FCs and encouraged the participants to share the information to those communities who could not attend the workshops.

At both workshops fisheries officials closed the session by thanking the participants for their contribution and for their active participation in the workshops. They also encouraged the participants to continue to involve and contribute to the project when it's implemented. They also said the purpose of the project is to bring more income for family while their traditional fishing production decreases. FiA also informed the participants that the project's safeguards instruments including RPF, IPPF, ESMF and EMP being translated into Khmer language will be disclosed to the public through the provincial fisheries offices, CNMC and FiA's website.

No.	Name	Position	From	Contact No.
1	Chun China	Programme assistant	WB- PP office	012 729294
2	Sor Sunthary	CFi deputy chief	Cheung Peat	092 504701
3	Lim Samrang	CFi member	-	088 7085201
4	Ngor Chheng	Head of CFi	Kampong Phnov CFi	097 79 82855
5	Houn Sreng	CFi member	Kbal Koh village	092 34678
6	Phan Thy	CFi head	Kbal Somnom village	097 6320299
7	Lei Sokleng	FiA officer	Kratie FiA Cantonment	092749376
8	Neang Sopha	CFi head	Koh Sam	097 5522288
9	Anted Thearith	CFi head	Ponda	092864148
10	Choun Thy	CFi head	Achein village	0979042679
11	I Sanaroth	FiA Officer	Kratie FiA cantonment	092722206
12	Yeun Yav	CFi head	Ampil Teuk	097487400
13	Chan Khemarak	Coordinator	MEDICAM	012 444 356
14	Sam Sovan	Executive Director	NRD	0977775788
15	Om Sokhun	-	CCD	012476834
16	Bou Sareun	Information officer	WB	012414088
17	Hun Sothea	Coordinator	KAFDOC	011554056
18	Chheng Phen	Acting director of	FiA	012875072
		IFReDI		
19	Touch	FiA officer	FiA	078206917

6. List of participants

On 25 March 2014 in Kratie Province

	Bunthorng			
20	Nein Thuok	CFi member	Vatanak CFi	-
21	Ou Sary	Deputy chief of Adm.	IFReDI, FiA	077321121
22	Sim Thavry	Deputy director	IFReDI, FiA	012894226
23	Vein Chung	Deputy chief	Kampong Roteas	0973476252
24	Ngeib Sokhom	-	Preah Kor	0885380153
25	Doung	CFi member	Damrei	0975067033
	Chantrea			
26	Chin Sorm	Network	Koh Dambang	0883525139
27	Sorm Nom	Deputy head	Sambo	0889627427
28	Khiev Oun	-	Kampong Cham	0929127667
			commune	
29	Mom Kosal	CFi head	Koh Pdav	0889843794
30	Hok Kin Eing	CFi deputy chief	Kampong Krabey	0978913475
31	An Hour	Chief of network	Koh Kngei village	0972917950
32	Ros Koy	CFi member	O'Kreang commune	0977405517
33	Chheng Chham	CFi head	O'Sandan	
34				
35	Heng Kong	National consultant-	Phnom Penh	016 640333
		WB		
36	So Socheat	Senior officer	Kratie-WWF	012535698
37	Pham Van	Environmental	WB-Hanoi	-
	Khang	specialist		
38	Him Hoy	PO	FLO	092707194
39	Sean Kin	Head of Kratie FiA	Kratie FiA Cantonment	012674889
		Cantonment		
40	Or Vanny	Executive director	CRDT	012454636
41	Keo Phat	CFi head	O'Krasang village	0929170980
42	San Di	CFi head	Yav	0888365068
43	I Sokheang	CFi head	Sampy village	0976654815
44	Sa Koy	CFi head	Kampong Khlieng	0976132147
45	San Theung	Deputy of chief	O'Krasang CFi	0978524162
46	Van Meuk	Patrol group	Kampong Kbeung	0978432714
			village	
47	Mut Nin	CFi head	Vatanak CFi	0886194949
48	Lim Sokhen	Chief of patrolling	Kampong Kbeaung	-
		group	village	
49	Vesna Bun	Senior officer	WB-Phnom Penh	-

No.	Name	Position	From	Contact No.
1	Pheak Saven	TLV	MVI	0976656483
2	Mao Sareth	CFi head	Koh Kenden CFi	012356240
3	Than Fan	CFi head	Koh Him	0886874213
4	Houn Chen	CFi member	Koh Him	-
5	Om Nean	-	Koh Kenden CFi	-
6	Pal Bunarak	Programme officer	RECOFTC	089927778
7	Chea Seila	Researcher	WorldFish	077555804
8	Bour Khantorng	CFi member	Koh Sneing village	0979813164
9	Khon Borin	CFi head	Koh Ki	078397270
10	Si Sour	CFi committee	-	011665905
11	Sin Sika	local officer	SCW	0887721329
12	Phat Tomy	Project assistant	CEPA	097777171
13	Van Lon	CFi committee	Koh Sralov CFi	0977408707
14	Leum Ngorng	Secretary	-	097971232
15	Heng Kong	National Consultant	WB-Phnom Penh	016640 333
16	Sim Thavry	Deputy director	IFReDI, FiA	012894226
17	Pham Van	Environmental specialist	WB-Hanoi	-
	Khang			
18	Vesna Bun	SIS	WB-Cambodia	012330360
19	Chea Vanna	CEPA assistant	CEPA	0974989039
20	Kheim Ra	Coordinator	PVT	0887511112
21	Sok Bin	Deputy Chief of CBO	Ngang Som village	0972656425
22	Chanty Dany	CFi member	Sdav II village	0884949381
23	Pheing Kosal	Deputy chief of CBO	Ngang Som village	0979790672
24	Phorn Phun	CFi member	-	0972656425
25	Tha Thorsanith	Head of CBO	Samkouy village	0886873487
26	Kheit Cherm	Village vice-chief	Sameki Thmey village	-
27	Hor Pengly	CFi head	Sangkat Sameki	0887555171
28	Lien Sokhom	CFi head	Koh Sneing village	0976288077
29	Por Khampor	Secretary	Phoum Thmey village	0884948900
30	Chhun China	PA	WB-Cambodia	012729291
31	Phang Lan	CFi member	Kham Than	0746399996
32	La Tha	-	-	0976582745
33	Prom Chun	-	Porng Teuk CFi	0977085322
34	Mao Loun	-	Anlong Svay CFi	0887100278
35	Srey Reim	Head of Extension	Dam Thom	0979901610
36	Heang Leung	CFi member	-	0978281732
37	Long Dim	Programme coordinator	Malop Baitorng NGO	012899471
38	Sok Lay	CFi deputy chief	Anlong Kambor	078397139
39	You Sokneat	FA& Senior producer	WCV	011773708
40	Keo Mib	Head of CBO	Kbal Romeas village	0975771507
41	Pen Chhundy	Head of S. Treng FiA	Stung Treng FiA	
		Cantonment	Cantonment	
42	Srey Samvicheat	Head of Sekong division	-	011365883

On 27 March 2014 in Stung Treng Province

43	Touch	FiA officer	FiA	078206917
	Bunthorng			
44	Chheng Phen	Acting director of IFReDI	FiA	012875072
45	Ou Sary	Deputy chief of Adm.	IFReDI, FiA	077321121