

TERMS OF REFERENCE
Package MAF/CQS 02: –
Dam Safety Inspection and Risk Assessment

Contracting Authority: Department of Planning and Finance, Ministry of Agriculture and Forestry (MAF)
Location: Vientiane Capital

I. INTRODUCTION

The Government of the Lao People’s Democratic Republic (GoL) received a US\$ 25 million credit from World Bank to implement the Agriculture Competitiveness Project (ACP). The project development objective is to enhance the competitiveness of selected agricultural value chains in the project areas. The project will be implemented over 6 years from 2018 to 2024 in five project provinces, including Khammouane, Bolikhamxay, Xayabouly, Vientiane Province, and Vientiane Capital. The project implementation is led by the Department of Planning and Finance (DPF) of the Ministry of Agriculture and Forestry (MAF), and its implementing agencies include technical departments of MAF, technical department of the Ministry of Industry and Commerce (MOIC), Provincial Agriculture and Forestry Offices (PAFO), Provincial Industry and Commerce Office (PICO) in the five project provinces. The project has four components: (a) Improved Agricultural Efficiency and Sustainability, (b) Enhanced Agricultural Competitiveness, (c) Project Management, and (d) Contingent Emergency Response:

Component A - Improved Agricultural Efficiency and Sustainability (est. US\$ 18.2 million, of which International Development Association (IDA) would finance around US\$ 16.3 million). This component will support: (a) the increased adoption of improved varieties and high-quality seeds, (b) the increased application of good agricultural practices, (c) the provision of critical productive infrastructure, and (d) the strengthening of public services delivery.

Subcomponent A1: Promoting Adoption of Good Varieties and Quality Seeds (estimated US\$2.5 million, of which IDA would finance around US\$2.3 million)

This subcomponent will support activities to promote the adoption of good varieties and quality seeds, including the provision of (a) technical assistance (TA) for the establishment of seed multiplication groups (SMGs) and building their capacity to adopt good varieties and quality seeds (including ones resistant to climate variability such as floods and drought) ; (b) Matching Grants to selected SMGs to carry out Sub-projects (i.e., small works, goods, equipment, and so on) for improving the production and postharvest handling, packaging, and storage of quality seeds; (c) technical and material assistance (i.e., small works, goods, equipment, training, and so on) to build the capacity of Provincial Agriculture and Forestry Offices (PAFOs), District Agricultural and Forestry Offices (DAFOs), MAF technical departments, and research institutions to conduct training for SMGs and to carry out seed quality monitoring and certification; and (d) TA to link SMGs with Farmer Production Groups (FPGs) and Agribusinesses (ABs) in marketing certified seeds.

Subcomponent A2: Promoting Good Agricultural Practices (estimated US\$7.4 million, of which IDA would finance around US\$6.2 million)

This subcomponent will support activities to promote GAP , including the provision of (a) TA for the establishment of FPGs and building their capacity to adopt GAP; (b) Matching Grants to

selected FPGs to carry out Sub-projects that implement GAP; (c) TA and material assistance (i.e., small works, goods, equipment, training, and so on) to build the capacity of PAFOs, DAFOs, and MAF technical departments to conduct training for FPGs on GAP and to carry out related extension and certification activities including soil analysis, organic fertilizer production, and organic farming; and (d) TA to link FPGs with ABs in marketing farm produce.

Subcomponent A3: Providing Critical Productive Infrastructure (estimated US\$6.2 million, of which IDA would finance around US\$5.7 million)

This subcomponent will support activities to improve critical irrigation infrastructure and water use practices, including (a) rehabilitation of selected irrigation schemes and (b) provision of TA to establish water user groups and to build their capacity to adopt improved water use models. Through improving water use, management, and productivity of existing irrigation schemes, it is expected to enhance their resilience to impacts of climate change.

Subcomponent A4: Strengthening Public Services Delivery (estimated US\$2.1 million, of which IDA would finance US\$2.1 million)

This subcomponent supports activities to strengthen agricultural and nutrition service delivery, including the provision of technical and material assistance (i.e., small works, goods, equipment, training, and so on) to (a) improve the overall extension service capacity of the PAFOs, DAFOs, and MAF technical departments to deliver better quality services to farmers to promote GAP adoption and enhance resilience to climate change; (b) develop and implement mapping and demarcation pilots for agricultural land in irrigated areas; and (c) conduct studies on integrated farming systems and diversification for nutrition, and carry out social behavioral change communication (SBCC) activities related to dietary diversity, adequate care practices, and processing and cooking for improved nutrition

Component B - Enhanced Agricultural Commercialization (est. US\$ 7.2 million, of which IDA would finance around US\$ 4.8 million). The project will support: (a) establishing an Agriculture Value Chain Facility (AVCF), (b) measures to better link farmers to markets, and (c) studies to improve the enabling environment for agro-enterprise and value chain development.

Subcomponent B1: Establishing an Agricultural Value Chain Facility (estimated US\$5.3 million, of which IDA would finance around US\$2.9 million)

This subcomponent will support the establishment and operation of an AVCF for the purpose of extending technical and financial services to AB), including the provision of (a) TA to establish and operate the facility and provide advisory and Subproject implementation support to ABs; and (b) Matching Grants to selected ABs to carry out Subprojects for upgrading their processing and postharvest handling facilities and their management capacities to improve product quality, increase operational efficiency (including improved energy efficiency), reduce physical losses, and link with FPGs to improve marketing of the farm produce.

Some 30 ABs operating in rice, maize, and vegetables will be selected and provided with matching grants. Sizes of the matching grants (50% of total cost) range from around US\$25,000 for a vegetable AB to around US\$ 125,000 for a rice AB. The total matching grants for ABs under the project will be around \$2.9 million. The eligible items that will be financed by ACVF include: goods, consulting services and civil works, as defined by Project Operation Manual (POM).

The AVCF will be supervised, on behalf of the Government, by a National Food Security Committee Secretariat, with majority of Government representatives, but also including private-sector representation. This committee will approve work plans, and review progress reports of the AVCF. An independent management entity (the consulting firm) is selected to be the “AVCF Management Team”. The AVCF Management Team will report on a day-to-day basis to the DPF. The business cycle of AVCF will consist of two stages:

Preparation phase:

- (1) Call for business proposals and assist interested ABs in preparing and submitted business proposals.
- (2) Assist the selected ABs whose business proposals are accepted to develop and submit the full business plans.

Implementation phase:

- (3) Provide technical advice to assist selected ABs in implement the approved business plans.
- (4) Monitoring the progress and evaluate the results

Subcomponent B2: Linking Farmers to Markets (estimated US\$1.4 million, of which IDA would finance US\$1.4 million)

This subcomponent will support activities designed to link farmers to markets, including the provision of TA to (a) strengthen the horizontal links of farmers within FPGs for implementing procurement, marketing, and other collective actions, and the vertical links of FPGs and ABs in productive partnerships to undertake further processing and marketing of the produce; and (b) develop an improved agriculture market information system to provide reliable market information for productive partnerships. Through strengthening the market linkages, it is expected to make farmers more resilient to climate change.

Subcomponent B3: Improving the Enabling Environment (estimated US\$0.5 million, of which IDA would finance US\$0.5 million)

This subcomponent will support activities by MAF technical departments, MOIC and other relevant agencies to improve the enabling legal, policy and institutional environment for supporting ABs investment and agricultural trade policies, including the development of improved sanitary and phytosanitary standards, rice standards and rice export policies, and improved import and export legislation focusing on agriculture inputs and farm machinery

Component C - Project Management (est. US\$ 2.9 million, of which IDA would finance US\$ 2.9 million). The component will support (a) project management; and (b) monitoring and evaluation.

Subcomponent C1: Project Management (estimated US\$2.4 million, of which IDA would finance US\$2.4 million)

This subcomponent will support the day-to-day implementation, coordination, and management of project activities including planning and execution, financial management (FM), procurement, internal and external audits, and environmental and social safeguards management.

Subcomponent C2: Monitoring and Evaluation (estimated US\$0.5 million, of which IDA would finance US\$0.5 million)

This subcomponent will support the day-to-day monitoring, reporting, and evaluation of project activities.

Component D: Contingent Emergency Response (US\$0 million)

This component with a provisional allocation of zero dollars is included under the project in accordance with OP10.00, paragraphs 12 and 13, for projects in situations of urgent need of assistance or capacity constraints. This will allow for rapid allocation of project proceeds in the event of the Government declaring that a crisis or emergency has occurred and the World Bank Group agreeing with such determination. This component would finance public and private sector expenditures on a positive list of goods and/or specific works, goods, services, and emergency operation costs required for emergency recovery. An Emergency Response Manual (ERM) will apply to this component, detailing FM, procurement, safeguards, and any other necessary implementation arrangements.

Under **Sub-Component A3-Providing Critical Productive Infrastructure**, the project is seeking to recruit a consulting firm to conduct an integrated and comprehensive dam safety assessment of five reservoirs in three provinces and to provide recommendations for structural and non-structural remedial measures for operation and maintenance. In this subcomponent, the project intends to rehabilitate 71 existing irrigation schemes. Among those schemes, there are five schemes intaking water from five reservoirs that are earth fill/earthen dams. Dimensions of the dams vary from one to another. Dam crest heights are ranging between 13 meters and 28 meters. Their nominal storage capacities are ranging between 2.2 and 28 million cubic meters. Detailed characteristics of the five irrigation reservoirs are listed below:

	Province	District	Reservoir Name	Dam height (meters)	Dam crest length (meters)	Storage capacity (million cubic meters)
1.	Vientiane	Thoulakhom	Nam Phot	18	2,101	16.00
2.	Sayabouly	Sayabouly	Nam Tien	28	628	28.00
3.	Sayabouly	Sieng Hone	Nam Mao	21	180	8.30
4.	Sayabouly	Sayabouly	Houay Khen	20	150	2.23
5.	Bolikhamxay	Borikhan	Nam Kap	13	220	4.34

Source: DOI, MAF

II. Objectives of the assignment

The objectives of this assignment are to assist MAF and Provincial Agriculture & Forestry Office (PAFO)/District Agriculture & Forestry Office (DAFO) as the responsible entity for ACP implementation and the 5 reservoirs owners and operators to:

- Assess the safety condition of the dams and appurtenant structures in accordance with the international and national standards as well as the WB OP / BP 4.37 for dam safety;
- Review and evaluate the owner’s operation and maintenance procedures;

- Assess the potential risks and hazards due to potential failure of the dam to local communities and assets, including assets to be financed as part of this project;
- Prepare a dam safety report including any safety issues and recommendation of remedial measures along with conceptual design and preliminary cost estimates
- Prepare dam safety plans, including operation & maintenance plan and emergency preparedness plan.
- Undertake Probable Failure Modes Analysis for two selected dams and organize stakeholder consultation and training workshops, whose results will also be documented as annex of the report.

III. Scope of work

To comply with Dam Safety requirements as per OP4.37, the project will recruit a consulting firm to (i) inspect and evaluate the safety status of the existing dam, its appurtenances, and its performance history; (ii) review and evaluate the owner's operation and maintenance procedures; (iii) assess the potential risks and hazards due to the potential failure of the 5 dams to local communities and assets, including assets to be financed as part of this project; (iv) provide a written report of findings and recommendations for any remedial work or safety-related measures necessary to upgrade the existing dam to an acceptable standard of safety; (v) undertake stakeholder consultation workshops including Probable Failure Mode Analysis and training sessions; (vi) prepare dam safety plans, including operation & maintenance plan and emergency preparedness plan.

Main tasks of the consultant at each dam location are, but not limited to:

3.1. Site Visits, Data Collection and Safety Checking

- Meeting with the representatives and technical staff of MAF and PAFO/DAFO to discuss safety condition of the dam and operation & maintenance procedures;
- Conducting detailed field and condition inspections of the dam and associated structures, such as spillway, inlet/outlet structures and gates/valves, control / monitoring instruments, etc.;
- Carry out all necessary site investigation and testing (including geotechnical and structural testing) as required to inform the detailed analysis;
- Using a standard check list to check the safety level of the dam and associated structures along with the level of urgency and priority for remedial works;
- Reviewing the design reports, drawings, construction supervision reports, as well as dam safety audit reports and post-event inspection reports (if any);
- Reviewing the data and records of the monitoring instruments from the beginning of the operation to date, and checking trends and anomalies (if any);
- Reviewing the design and condition of monitoring instruments and quality of data collection, storage, and analysis;
- Reviewing the O&M Manual, organizational structure, staff capacity, and training needs;
- Undertake an assessment of the downstream hazards, such as industrial/ commercial/ agriculture areas, approximate number of communities and houses,

infrastructures (roads, railroads, etc.) that can be flooded by potential failure of the dam.

3.2. Detailed Dam Safety and Risk Assessment Analyses and Evaluation

- Performing engineering analyses (geotechnical, structural or hydraulic) to assess the safety conditions of the dam and associated structures
- Undertaking stability analysis of the dam and associated structures, including factors of safety for normal, unusual and extreme loading conditions, and using internationally acceptable method
- Assessing the seismic hazard of the dam located area and adequacy of loading criteria/ conditions used for design of the dam. This should include but not be limited to the characterization of site-specific ground motions and determination of the limiting failure modes and the associated probability of exceedance, including foundations. As a minimum, non-linear dynamic and soil/structure interaction analyses for the existing intake/outlet structures should be completed;
- Assessing the upstream catchment and reservoir rim conditions in regard to formation of landslide and handling of floods and waving factors caused by such events;
- Checking the seepage condition and analysis of the dam body, foundation and abutments to check the effectiveness of foundation treatment and seepage control measures;
- Checking the flood hydrology and design flood (100 years, 200 years, 1,000 years, etc.), reservoir routing and spillway sizing, considering the present conditions of the catchment and reservoir silting with reference to the MAF and international standards;
- Checking the hydraulic design and condition of the spillway, including gates and electrical / mechanical parts, as well as energy dissipating arrangements and downstream conditions;
- Checking the design and conditions of the intake and outlet works, including the capacity for emergency reservoir drawdown, sediment handling capability, selective thermal releases, regulation range and other factors, etc.;
- Reviewing the catchment conditions, silting level of the dam reservoir, sediment deposit volume, and condition of sediment flushing facility (if any);
- Assess the remaining service life and performance levels of the existing structures in accordance with internationally accepted methods.

3.3. Preparation of Dam Safety Inspection and Risk Assessment Report

For each reservoir, the Consultant shall prepare a comprehensive Dam Safety Inspection and Risk Assessment Report, summarizing its findings and recommendations on dam safety and risk assessment along with urgency and priority levels. At a minimum, the report should include;

- Recommendations for required remedial measures for ensuring the safety and resilience of the dam and associated structures along with priority levels (immediate, mid-term, and long-term)

- Recommendations for additional field survey, investigation, testing, etc. for detailed risk assessment, if any.
- Recommending on the upgrading needs for the Operation & Maintenance (O&M) Plan and Emergency Preparedness Plan, and if not available, provide the framework of those plans along with useful samples and formats.
- Recommending a suitable set of sedimentation management measures including catchment management, check dams, hydraulic suction/dredging, sediment flushing/slucicing measures, etc. if required
- Recommending an assessment of potential environmental and social impacts related to the findings of the report and the proposed upgrading/ remediation measures.

3.4. Preparation of Conceptual Designs and Cost Estimates for Remedial Measures

Following agreement from the Client on the priority options for addressing and strengthening the safety and resilience of the dams and associated structures, the Consultant shall prepare for each dam;

- Conceptual designs
- Preliminary cost estimates (including any ongoing maintenance and operation costs as appropriate) and construction timeline for the identified upgrading and remedial measures
- TORs for further investigative works, detailed design of resilience improvements, remedial works and construction supervision.

3.5. Preparation of Dam Safety Plans – Operation & Maintenance Plan and Emergency Preparedness Plan

The consultant should prepare the interim O&M plan (including a minimum set of monitoring instruments) and EPP for five dams. Whilst the consultant is not required to undertake detailed dam break and downstream flooding simulation / mapping, it should conduct simplified analyses and indicate potential flooding areas / affected communities / main infrastructure such as roads, in case of dam failure. The consultant will also prepare a proposal for undertaking detailed analyses and preparing full-fledged plans.

3.6. Stakeholder Workshops for Discussing Team’s Findings and Recommendations

The consultant should discuss its findings and recommendations for five dams based on its safety inspection and assessment at a workshop inviting key stakeholders including MAF, DOI, PAFOs, DAFOs and WUGs. The consultant should also highlight critical design issues and recommend a set of suitable design criteria along with remedial measures based on the review of the five dams design and technical discussions.

3.7. Probable Failure Modes Analyses

The consultant should undertake Probable Failure Modes Analysis (PFMA) of

two selected dams out of five dams based on its initial dam safety inspection and assessment. The mission suggests that the consultant may use the case of the Nam Phot Dam as one example for the PFMA given its dam safety risks. The consultant should discuss the PFMA findings and recommendations with the key stakeholders at the workshop.

3.8. Provision of Dam Safety Training

Third, the consultant should provide dam safety training for the staff of the MAF/DOI, PAFOs and DAFOs including technical standards, monitoring instrumentation, surveillance procedure, O&M Plan, EPP, etc. with reference to relevant technical guidelines, such as the Lao Electric Power Technical Standard (LEPTS) of MEM which covers hydropower dam safety along with a set of technical guidelines, technical bulletins of the International Commission on Large Dams (ICOLD), and technical guidelines /manuals of selected countries/entities.

IV. Qualification Requirements for the Assignment

4.1. The following requirements shall apply to the firms to qualify for the assignment:

- Be a legal entity acceptable to the Department of Irrigation of the Ministry of Agriculture and Forestry (MAF).
- At least 20 years of general experience implementing management contracts worldwide and specifically in developing countries.
- At least ten years of specific experience in providing similar services in developing countries, working experience with international financial institutions funded projects is a plus.
- Proven record on successful completion of at least three assignments related to the assignment over the last 5 years.

4.2. Qualifications and Scope of Work of Experts

4.2.1 Dam safety Specialist (Team Leader)

a) Qualifications:

- have at least a university degree in civil engineering or related field of expertise. He/She will have at least 20 years' experience of designing, supervising, reviewing or operating and maintenance of dams in multiple countries in particular in Asia and familiar with international standards and good practices on dam safety.

- Experience at least one project involving large dams funded by international/bilateral agencies is a plus. He/she should also be familiar with the institutional and regulatory aspects of dam safety as well as the national standards, such as LEPTS, and international standards, such as ICOLD.

b) Scope of work:

- Ensure overall implementation quality of the consultancy in coordination with other experts
- Review existing documentation: design, environmental impact assessment, inspection report, irrigation O&M monitoring report, etc.
- Conduct detailed on-site inspection of the 5 pre-identified potential dam sites under component A3 of the project as described in the table above. The inspection will use best practices and standards
- Produce a detailed assessment report for each of the 5 dams, presenting evidence-based conclusion on the Dam Safety status
- Provide recommendations for any remedial work or safety related measures necessary to upgrade the existing dam to an acceptable standard of safety
- Provide recommendations on additionally required investigations, survey, analyses, etc. required for detailed safety assessment and design of remedial works.
- Lead preparing the synthesized dam safety inspection and risk assessment report presenting conclusions of the assessment for the 5 dams in coordination with other experts of the team.
- Lead in preparing interim dam safety plans, i.e. O&M Plan and EPP in a simplified manner.
- Lead in conducting the Probable Failure Modes Analyses of two selected dams in coordination with the MAF and other relevant stakeholders.
- Lead in organizing workshops for discussing the team's findings and recommendations in coordination with MAF and other relevant stakeholders.
- Lead in organizing training sessions in coordination with MAF and other relevant stakeholders.

4.2.2 Geology/Geotechnical Specialist

a) Qualifications:

- have a degree related to the subject and more than 20 years of experience,

- be familiar with the international standards and good practices on geological / geotechnical engineering, and preferably including ones financed by international/bilateral agencies.

b) Scope of work:

- Review all available geological data (regional maps, boreholes logs, satellite and remote sensing images, etc.) to assess the geological features of the dam sites and reservoir areas.
- Review and assess the available geotechnical data on construction materials and evaluate their consistencies for the design and construction of the dam.
- Inspect the foundation/ abutments of dam sites as well as reservoir conditions in particular any stability and seepage issues
- Propose conceptual design of remedial and safety improvement works for the foundation and abutments of the dams and associated structures
- Provide recommendations for supplementary geotechnical investigations, including geophysical surveys, core drilling, etc., to assess any foundation stability and seepage issues.

4.2.3 The Hydrologist

a) Qualifications:

- have a degree in hydrology or related field of expertise. He/She should have at least 15 years' experience in hydrology studies, feasibility studies of reservoir,
- be familiar with the international standards / good practices on hydrological assessment.

b) Scope of work:

- Review existing documentation: design, environmental impact assessment, inspection report, irrigation O&M monitoring report, etc;
- Conduct an assessment of the watershed and river catchment upstream of the dam, including potential hydrological risks, such as noticeable change in watershed conditions, large sediment deposits, etc.;
- Review all available hydro-meteorological and reservoir operation data as well as any relevant monitoring/operational reports and assess

any noticeable changes/trends during operational years and also consider impacts of potential climate change in the future

- Carry out an assessment of the reservoir to identify potential risks and issues in management modalities of each of the 5 dams;
- Produce a detailed assessment report for each of the 5 dams, presenting evidence-based conclusion on the hydrology status of the dams and their upstream river catchment;
- Provide recommendations for any remedial work or safety related measures necessary to upgrade the existing dam to an acceptable standard of safety;
- Provide recommendations on any additionally required hydrological assessment and hydraulic survey, etc.
- Contribute to the synthesized dam safety inspection/ risk assessment report presenting conclusions of the assessment for the 5 dams systems as well as other exercises including dam safety plans preparation, PFMA and training sessions.

4.2.4 The irrigation specialist

a) Qualifications:

- have a degree in irrigation or related field of expertise. He/She will have at least 15 years experience in irrigation survey and design, irrigation standard and best practices, operation and maintenance of gravity irrigation schemes and in particular of reservoir irrigation schemes in Asia.
- Experience at least one irrigation project funded by international/bilateral agencies is a plus.
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b) Scope of work

- Review existing documentation: design, environmental impact assessment, inspection report, irrigation O&M monitoring report, etc.
- Conduct an assessment of the irrigation infrastructures downstream of the dam, identifying potential risks at the main water intake and spillway, distribution network and association structures
- Carry out an assessment of the current irrigation O&M management modalities by Water Users Groups and Irrigation Agencies staff assigned at each of the 5 dams
- Produce a detailed assessment report for each of the 5 dams, presenting evidence-based conclusion on the irrigation operation and maintenance status of the dams and their downstream irrigation infrastructures

- Provide recommendations for any remedial work or safety related measures necessary to upgrade the existing dam to an acceptable standard of safety
- Contribute to the synthesized dam safety inspection and risk assessment report presenting conclusions of the assessment for the 5 dams systems as well as other exercises including dam safety plans preparation, PFMA and training sessions.

V. Reporting

Dam Safety Inspection and Risk Assessment Reporting

- The Dam Specialist / Team Leader will take a lead in orchestrating and preparing a single mission report combining inputs from the other three specialists, i.e. geology/geotechnical specialist, hydrologist, and irrigation specialist. The report will include details regarding all activities carried out as well as reviewed documentation and meetings held during the mission in country. The report will include (i) a description of the assessments conducted, and the methodology and protocols used; (ii) the conclusions as well as the recommendations of the core experts; (iii) recommendations for any remedial work or safety related measures necessary to upgrade the existing dam to an acceptable standard of safety. Annexes will include i) the interim dam safety plans, i.e. Operation & Maintenance Plan, and Emergency Preparedness Plan, ii) the results of stakeholder consultation workshops, PFMA, and training sessions; and iii) detailed results of dam safety inspection and risk assessment including pictures, drawings, diagrams, etc..
- The draft dam safety inspection and risk assessment report will be submitted to the Project Executing Agency and the World Bank no later than 15 days after the end of the mission in country. Comments will be made on the draft report within one month of the date of submittal. A revised version of the report will be prepared by the core consultant team to address comments. The final report will be submitted no later than 15 days after comments have been officially addressed to the core consultant team. The Project will arrange for translation of the relevant sections of the report as deemed necessary. The EA will then assign responsibility to the involved Department within MAF, including Department of Planning and Finance (DoPF) and Department of Irrigation (DoI) in charge of technical aspects.
- The annexes of the reports including stakeholder workshops, PFMA, dam safety plans, training session summary, etc. can be sent later within one month after mission ending in country.

VI. Timing and Deliverables

Mobilization of the Dam Safety Inspection and Risk Assessment Team

- Mobilization for this assignment is expected within two weeks after contract signature.
- The Ministry of Agriculture and Forestry (the project executing agency) will assist in organizing the in-country mission and arranging the assessment and consultations at each of the 5 dam sites.
- During the Dam Safety inspection mission, the core consultant team will work under the overall leadership / coordination of the team leader / dam specialist.

- The team will also work in close coordination with representatives from MAF and its concerned departments: Department of Planning and Finance as well as Department of Irrigation. The MAF representatives will ensure that all relevant stakeholders at local level are mobilized for each of the 5 dam sites to be reviewed and inspected by the core consultant team. Those stakeholders include: Provincial Agriculture and Forestry Department, District Agriculture and Forestry Offices, Water Users Groups in charge of the daily Operation and Maintenance of the irrigation infrastructures.
- The core team is expected to undertake two missions: i) dam safety inspection of 5 dams including workshops (around 2 weeks), and ii) reporting of inspection/risk assessment results and remedial measures of 5 dams including workshops (around 2 weeks).
- The core team is expected to organize workshops for discussing the team's findings and recommendations, including PFMA, and training during the two missions.
- The firm may hire a national coordinator for translation service during missions, workshops, and an executive summary report preparation in Lao.

All reports, drawings, documentation and correspondence are to be written in English. An executive summary of the Detailed Dam Safety Due Diligence and Risk Assessment report shall be provided in Lao language.

The workshop proceedings including the PFMA and training should be prepared as annexes for the draft and final reports.

The interim dam safety plans, i.e. O&M Plan and EPP, will be included in the draft and final reports.

Deliverables		Time Schedule (from commencement of the assignment)
1	Inception Report	1 month
2	Draft Dam Safety and Risk Assessment Report	3 months
3	Final Dam Safety and Risk Assessment Report	5 months

Source of information

*Department of Planning and Finance, Ministry of Agriculture and Forestry
Project Management Unit,
Tel/Fax: 021 410074*