

**INTEGRATED WATERSHED AND WATER RESOURCES MANAGEMENT PROJECT,
SRILANKA**

TERMS OF REFERENCE

**CONSULTANCY SERVICE FOR DAMS PORTFOLIO RISK ASSESSMENT
AND PREPARATION OF OPERATION AND MAINTENANCE (O&M) PLANS AND
EMERGENCY PREPAREDNESS PLANS (EPP) FOR IDENTIFIED DAMS.**

1. Background

This World Bank (WB) funded project assists the Government to achieve important policy and institutional objectives and support critical investments including dam safety. In particular, the project will provide investments for rehabilitation / upgrading of 36 dams and the support strengthening of the institutional framework for dam safety management and operation, including dam portfolio risk assessments and preparation of dam safety instruments. The implementing agencies of the dam safety component are the Irrigation Department, Mahaweli Authority of Sri Lanka, Northern Provincial Council and Eastern Provincial Council, but other relevant authorities are also involved in enhancing the national institutional framework.

In order to effectively manage the large portfolio of dams in Sri Lanka, it is important to develop a robust and practical risk assessment framework. A preliminary risk screening index was carried out in 2019 during the project preparation. This risk screening included parameters on work category, storage capacity, population at risk, water usage, last year of rehabilitation, dam safety command area and dam height. The preliminary risk screening did not include parameters for structural conditions and operational status of dams, which are both critical for evaluating the risk reduction profile after the project intervention. Thus, this project aims to develop a more systematic and comprehensive portfolio risk assessment and management system for proper assessment of the dams' risk profiles, which will allow for prioritization of remedial measures.

The approach is indeed in line with the WB policy for dam safety as detailed in its Good Practice Note (GPN) on Dam Safety (October 2020) and accompanying Technical Notes (TNs) and Appendixes (2021), which should be useful references for this consultancy.

2. Objective

The objective of this consultancy is to develop and apply a systematic dam safety risk assessment framework, using a three-tiered risk assessment process beginning with the risk index (RI) as the first step toward the realization of a more rigorous, transparent, and institutionalized process of risk assessment. The framework will be based on the principle that the risk associated with dams is comprised of two factors: (i) likelihood of failure / vulnerability (considering potential failure modes); and (ii) consequence of failure (population at risk, major infrastructure...etc.). Based on the result of the initial risk screening at Tier 1, the consultancy will conduct higher level of risk assessment with supplementary studies and investigation and preparation of detailed remedial measures for higher risk dams including structural and non-structural measures. This standardized and systematic method for assessing dam risk will allow for enhanced prioritization of risky dams and their remedial measures. Training and capacity building of the GoSL agencies is critical and will be covered by this consultancy.

3. Scope of Services, Tasks and Expected Deliverables

The scope of this consultancy is developing of dam safety risk assessment for the dams selected under the project and followed by preparing/ updating operation and maintenance Plans and emergency preparedness plans (EPP) for the High and medium risk dams. A more systematic and comprehensive Portfolio Risk Assessment (PRA) and Portfolio Risk Management (PRM) system will be introduced for dam safety risk assessment. The PRA/ PRM system will include (a) vulnerability index of the dam's structure (such as

structural defects, foundation condition, adequacy of spillway capacity etc.); (b) Consequence index (major infrastructure and other socioeconomic impacts in addition to PAR) (c) Management capacity index (availability of O&M plan, EPP, staff capacity etc.)

Therefore, based on activities to be implemented, it is systematically divided into following seven tasks.

Task 1: Development of the Risk Index (RI) Scheme for the national portfolio risk assessment:

Task 2: Application of the Risk Index (RI) scheme to 36 dams under the project and training of owner's experts for their application to other dams:

Task 3: Dam Breach & Consequence Assessment for medium / high risk dams:

Task 4: Preparation of Operations and Maintenance (O&M) Plan and Emergency Preparedness Plan (EPP) for medium / high risk dams:

Task 5: Application of the Potential Failure Mode Analysis (PFMA) for high-risk dams:

Task 6: Application of Quantitative Risk Assessment for high-risk dams:

Task 7: Training and Capacity Building of GoSL Institutions:

3.1. Tasks to be done by The Consultant

Task 1: Development of the Risk Index (RI) Scheme for the national portfolio risk assessment:

The consultant will develop the initial risk index scheme in consultation with the national authorities with reference to the WB TN 6 on Risk Index and other references. The consultant will also conduct initial testing of the scheme / procedure and calibration of parameters on six (6) sample dams, which represent each 3 dams from concrete and embankment types with different risk levels (high, medium, and low) which can be adjusted, in consultation with dam owners/ authorities and prepare a concise manual. The consultant should also consider how to evaluate the effects of the remedial measures to be undertaken in the RI scheme by the project.

Task 2: Application of the Risk Index (RI) scheme to 36 dams under the project and training of owner's experts for their application to other dams:

36 dams have been selected under the project (Annex 02) would be screened through RI scheme developed under Task 1. The consultant will review dam safety inspection / assessment reports which are shared by the dam owners / authorities to provide inputs for the RI scheme. The consultancy is also expected to carry out field visit to all dams which do not have adequate information on dam safety conditions and conduct dam safety inspection / assessment in coordination with the dam owners. The client will share available data / information, such as as-built drawings, design / geotechnical investigation reports, monitoring data...etc., which will be reviewed by the consultant for the risk analyses. In addition, the consultant should undertake preliminary consequence assessment based on topographic maps...etc. A preliminary assessment of the effects of remedial measures to be done by the project should be considered in the RI for each dam. The WB GPN on Dam Safety and Appendix 6: Sample TORs for Existing Dam Safety Review should be used for guidance and reference. The consultant will also provide training for designated experts by dam owners / authorities using the manual so that they can apply the RI to other dams beyond the current project as part of Task 7. Moreover, the consultant shall be taken account of the utilization of open source/ cost effective tools for the assessment which enable dam owners to utilize the Risk Index Scheme to other dams on the horizon.

Task 3: Dam Breach & Consequence Assessment for medium / high risk dams:

The consultant will conduct a dam breach analysis and flooding simulation / mapping for twelve (12) medium-risk, high-risk dams, the number of which could be adjusted based on the result of Task 2, i.e., risk screening (Tier 1). This would include an assessment of suitable tools and resources for required Digital Elevation Model (DEM) and flood simulation models required for the estimate of the maximum inundation extent downstream of the dams. DEM by free satellite images, such as Hydro SHEDS (USGS)...etc. may be

used for flooding simulation / mapping, but higher resolution DEM provided by commercially available satellite images or LiDAR survey could be required for some flatter and densely populated floodplain areas which may require more accurate and detailed information on potential flooding. Along with intersected GIS layers, the consultant will undertake consequence assessment including an estimation of Population at Risk (PAR), Potential Loss of Life (PLL), profiles of impacted land covers, major infrastructure...etc. The WB GPN on Dam Safety should be referred. The consultant will also provide training for designated experts by dam owners / authorities as part of Task 7.

Task 4: Preparation of Operations and Maintenance (O&M) Plan and Emergency Preparedness Plan (EPP) for medium / high risk dams:

The consultant will prepare or upgrade the O&M Plan and EPP for 12 moderate and high risk dams, the number of which could be adjusted based on the results of Task 2. The consultant will also organize stakeholder workshops for a group of dams located in the same basin ((preliminary estimate) by coordinating with the authorities / dam owners. The WB GPN on Dam Safety and Appendix 3: Sample Framework O&M Plan and Appendix 4: Sample Framework EPP should be used for guidance and reference. The consultant will also provide training for designated experts by dam owners / authorities as part of Task 7.

Task 5: Application of the Potential Failure Mode Analysis (PFMA) for high-risk dams:

Based on the results of Task 2 and 3, the consultant will apply the PFMA for eight (8) high risk dams, the number of which may be adjusted based on the results of Task 2. This will involve failure mode identification and classification of risky dams, identify investigation / surveillance needs, and recommend risk mitigation measures covering structural and non-structural ones. The consultant will organize a 2-day workshop including dam owners, operators, and other stakeholders and prepare the required materials and a summary report for each dam. The WB TN 5 on PFMA should be referred to. The client will share all available data/information, such as as-built drawings, design/geotechnical investigation reports, monitoring data, operational records, etc for the Consultant. The consultant will undertake required analyses/assessment, such as hydrological assessment, based on the shared operational records and hydro-met monitoring data. If necessary, the consultant shall undertake survey, geotechnical investigation, tests, etc. (from ISO certified laboratories) of some risky dams in particular which may be raised to Tier 3 risk assessment under Task 6. The consultant will also provide training for designated experts by dam owners/authorities as part of Task 7.

Task 6: Application of Quantitative Risk Assessment for high-risk dams:

Based on the results of Task 5, the consultant will undertake quantitative risk assessment for 4 (four) high risk dams which involve complicated and significant remedial measures, the number of which may be adjusted based on the results of Task 5. The consultant will conduct detailed risk analyses of the dams undertaking additional studies etc. making use of the survey and investigation etc. requested at Task 5 stage and recommend a list of detailed remedial measures including options assessment covering structural and non-structural ones (enhanced surveillance, instrumentation...etc.). In particular, this will involve a review of expert knowledge elicitation procedure of probability distribution of dam failure risks. The consultant will also provide training for designated experts by dam owners / authorities as part of Task 7.

Task 7: Training and Capacity Building of GoSL Institutions:

The consultant will provide training for designated counterparts staff for around 30 staff in total each time, organizing 10 sessions (webinars, in person classroom, and site visits, covering the above key tasks).

3.2. Deliverables

The Consultant shall prepare and submit the reports listed below. All reports should be accompanied by an executive summary. One original and four copies in color of each report should be submitted to the PMU in addition to an electronic copy of the same. All electronic submittals including the EPP, and flooding simulation maps will be shared with a cloud base storage system based on consultation with the client.

Inception Report: A report summarizing results of the initial information collection, identified key issues requiring guidance and decisions, and outline of the work plan including an updated work schedule.

- D-1** – Inception report comprising detailed methodological approach to the study, boundary conditions, limitations, format of O&M plan and EP plan and detailed work plan.
- D-2** - Report for the Risk Index Scheme for the entire national dam's portfolio including a concise manual in consultation with the GoSL agencies.
- D-3** - Report for the application of 36 dams to the developed Risk Index Scheme for and summarize the outcomes of the scheme with respect to each dam (Tier 1 Initial risk screening) in consultation with the GoSL agencies.
- D-4** - Summary Report for Dam Breach Analysis & Consequence Assessment for the medium and high risk dams and followed by each report for 12 (preliminary estimate) medium / high risk dams including summary statistics of consequences, flooding maps, and other relevant data features.
- D-5** - Each report comprising Sophisticated Emergency Preparedness Plan (EPP) and newly prepared or upgraded O&M plans for 12 (preliminary estimate) medium / high risk dams.
- D-6** - Summary PFMA Report covering their workshop materials, summary discussions and conclusions with each PFMA report for 8 high risk dams raised to Tier 2.
- D-7** - Summary Quantitative Risk Assessment Report with each report for 4 high risk dams raised to Tier 3.
- D-8** - Training Summary Report including 10 workshop report with training materials and summary for each session.
- D-9** - Consultancy Summary Report summarizing the key results of all tasks, any remaining critical dam safety issues, and recommendations for additional studies in the context of dam safety.

4. Duration

The duration of the assignment is **15 months** from the commencement date of the Consultancy service. The selected Consultant is expected to work together with owners of the selected dams and PMU for preparing a work plan for the Consultant to carry out the above tasks.

5. Team Composition and Qualification Requirements for Key Staff (with Expected Staff Months)

NO.	KEY STAFF	QUALIFICATION AND EXPERIENCE REQUIREMENTS	KEY -STAFF INPUTS IN PERSON - MONTHS
K1	Project Manager / Team Leader	Master's Degree in civil engineering, or equivalent, with at least 20 years of work experience in large dam's feasibility study, design, construction supervision, safety review, preparation of dam safety plans, such as O&M Plan and EPP and safety review of large dams including at least 5 dam's related assignments with IDA fund in Sri Lanka and working in at least 2 other countries. Versed with the international and national standards, guidelines, and good practices of dam safety.	15
K2	Dam Safety Specialist	Master's degree in civil and/or geotechnical engineering with at least 15 years of experience in large dams, covering qualitative and quantitative risk analyses /assessments including PFMA workshop facilitation, and dam safety plans.	10

No.	KEY STAFF	QUALIFICATION AND EXPERIENCE REQUIREMENTS	KEY -STAFF INPUTS IN PERSON - MONTHS
K3	Engineering Geologist/ Geotechnical Engineer	Master's Degree in Geology, Engineering Geology or Civil Engineering with at least 15 years of experience in the assessment of geological risks and design of required treatment works in foundation, abutment, reservoir rim, etc. for large dams	5
K4	Hydrologist	Master's Degree in hydrology, water resources, or relevant fields with at least 15 years of experience in the hydrologic assessment for large dams.	5
K5	Hydraulic Engineer	Master's Degree in civil engineering with at least 15 years of experience in the hydraulic design, flooding simulation, mapping, etc.	5
K6	Electro-Mechanical Engineer	Master's Degree (or equivalent) in electro or mechanical engineering with at least 15 years of work experience including electro-mechanical and hydro-mechanical equipment for dams' operation, such as gates/ valves of spillway, outlet works, etc.	4
K7	Dam Instrumentation Specialist	Master's Degree in engineering with at least 10 years of experience in instrumentation, monitoring procedure, data analyses, etc. for large dams.	4
K8	Seismic Specialist	At least Master's Degree in Seismic Hazard Assessment, Geology, or related field with at least 15 years of experience in the assessment of seismic hazards including at least 5 large dams.	2
Total (Man-Months)			50

6. Schedule for Completion of Tasks

The assignment shall be completed within 15 months from the date of contract award. A detailed roadmap / work plan for development and operationalization of complete the assignment must be submitted along with the proposal, which will be used as a work plan in assessing progress of the assignment.

6.1 Time schedule for Deliverables

Description	Indicative Date of Submission
D-1	1 st month from date of contract commencement
D-2	2 nd - 3 rd month from date of contract commencement
D-3	4 th - 6 th month from date of contract commencement
D-4	6 th - 12 th month from date of contract commencement
D-5	12 th - 15 th month from date of contract commencement
D-6	6 th - 12 th month from date of contract commencement
D-7	12 th - 15 th month from date of contract commencement
D-8	3 rd - 15 th month from date of contract commencement
D-9	15 th month from date of contract commencement

**The submissions will be reviewed by Critical Review Committee which is to be appointed by Project Director. Each time frame includes review and acceptance by client review committee of the respective deliverables within two weeks period.*

Time Schedule for Deliverables

Item	Description	Months														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
D-1	Inception report comprising detailed methodological approach to the study, boundary conditions, limitations, format of O&M manual and EP plan and detailed work plan.	■	■													
D-2	Report for the Risk Index Scheme for the entire national dam's portfolio including a concise manual in consultation with the GoSL agencies.		■	■	■											
D-3	Report for the application of 36 dams to the developed Risk Index Scheme for and summarize the outcomes of the scheme with respect to each dam (Tier 1 Initial risk screening) in consultation with the GoSL agencies.				■	■	■	■								
D-4	Summary Report for Dam Breach Analysis & Consequence Assessment for the medium and high risk dams and followed by each report for 12 (preliminary estimate) medium / high risk dams including summary statistics of consequences, flooding maps, and other relevant data features.						■	■	■	■	■	■	■	■	■	
D-5	Each report comprising Sophisticated Emergency Preparedness Plan (EPP) and newly prepared or upgraded O&M manual for 12 (preliminary estimate) medium / high risk dams.														■	■
D-6	Summary PFMA Report covering their workshop materials, summary discussions and conclusions with each PFMA report for 8 high risk dams raised to Tier 2.						■	■	■	■	■	■	■	■		
D-7	Summary Quantitative Risk Assessment Report with each report for 4 high risk dams raised to Tier 3.														■	■
D-8	Training Summary Report including 10 workshop report with training materials and summary for each session.			■	■	■	■	■	■	■	■	■	■	■	■	■
D-9	Consultancy Summary Report summarizing the key results of all tasks, any remaining critical dam safety issues, and recommendations for additional studies in the context of dam safety.															■

6.2 Payment Schedule for Deliverables

The payments are linked with the abovementioned Deliverables. The payments will be released only upon the acceptance of the deliverables by the Critical Review Committee.

Deliverable	Percentage out of Contract value
D-1	5%
D-2	5%
D-3	7.5%
D-4	15%
D-5	7.5%
D-6	15%
D-7	10%
D-8	15%
D-9	20%
Total	100%

7. Procedure for Review of Progress

The following procedure shall be followed to monitoring the assignment.

- The consultant is expected to keep the Client informed of all the activities undertaken, progress made therein and future on weekly basis.
- The consultant shall attend progress meetings which will be convened at time to time by the Client.
- The consultant is required to communicate to PMU in writing for any clarifications, changes and seek approval during the contract period.

- The consultant shall prepare a monthly progress report mentioning list activities performed, ongoing and planned as per the work plan.
- The report writing shall start from the first week itself of commencement of the contract to communicate with client until completion of the contract.

8. Selection Process

A consultant will be selected through Quality and Cost Based Selection (QCBS) pursuant to procedures set out in the World Bank procurement guidelines: “*Procurement Regulations for IPF Borrowers (dated July 1, 2016, revised in November 2017 and August 2018)*).

9. Working Arrangements

Client:

- I. The PMU Project Director will provide overall guidance to the Consultant in coordination with the implementing agencies (IAs) and dam owners. The committee will be responsible for review and approval of the deliverables in coordination with IAs. All contractual matters will be channelled through the PMU.
- II. The PMU will coordinate to provide all data/information required for the consultancy.
- III. The PMU will also invite relevant participants for the trainings.
- IV. Available Data Checklist is attached as Annex 3

Consultant:

- I. The Consultant will manage all aspects of the consultancy services under the lead of the Project Manager/Team Leader in coordination with the designated representatives of the PMU.
- II. The Consultant shall provide its own facilities, including office space, office equipment (computers and software, etc.) and vehicles required for the work by the Consultant’s staff.
- III. The Consultant will also provide the venues and associated facilities for the trainings.

Annexure 01

Portfolio Risk Assessment and Management Approach (from the WB GPN on Dam Safety)

The risks associated with the safety of dams vary depending on the structural components, socio-economic factors, and the environment in which the dam is being constructed/rehabilitated and will operate. Application of the requirements with respect to safety of dams will need to reflect these considerations, and be proportionate to the size, complexity and potential risk of the dam.

Thus, the World Bank has prepared a Good Practice Note (GPN) on Dam Safety (WB, October 2020). The GPN and its accompanying Technical Notes (TNs), in particular TN 5 on Potential Failure Mode Analyses (WB, 2021) and TN 6 on Portfolio Risk Assessment using Risk Index and (WB, 2021) provide guidance on applying risk assessment techniques and procedures using a three-tiered approach that places an emphasis on fitness for the purpose and is informed by the country's context.

Tiered Risk Assessment

As per the three-tiered risk assessment approach detailed in the GPN, basic analysis should be carried out first to identify the significant risk contributors, followed by more detailed assessment of these where justified. The effort required for analyses in each of the tiers should be generally proportionate to the level of risk. A Tier 1 basic risk screening is the first important step and prerequisite for all dams. On the other hand, a Tier 3 assessment may be undertaken only when an initial Tier 1 or 2 assessment has identified high potential risks and the magnitude of these risks would justify the effort required to analyze and reduce the uncertainties around the estimates to adequately support management decisions on required risk reduction measures.

Thus, it is important to develop a risk assessment and classification framework on dam safety using the three-tiered risk assessment approach and suitable risk assessment techniques. The first tier consists of a preliminary risk screening using a risk indexing approach that can be applied to all dams in the country. The second tier of the framework will involve failure mode identification and classification of risky dams identifying investigation/surveillance needs and potential risk mitigation actions. The third tier of the framework will involve detailed risk analyses of high-risk dams using quantitative risk analyses to confirm a list of detailed remedial works as well as additional studies, enhanced surveillance /instrumentation, etc. required.

Tier 1 – Initial Risk Screening with Risk Indexing Scheme

As the first step, the GPN advises that initial risk screening is to be undertaken for all dams to preliminarily identify the dams that could have more risk and should be elevated to Tier 2-3 risk assessments. The consultancy will develop a suitable risk index scheme for the country to understand the risk profile of the entire portfolio of dams and to inform the prioritized allocation of resources. The aforementioned TN on Portfolio Risk Assessment Using Risk Index provides guidance for developing a risk indexing scheme.

As per the GPN and TN for Risk Index, the risk of a dam is defined as the product of the fragility/vulnerability of the dam and the potential consequence/hazard associated with the dam. The fragility/vulnerability score is calculated as the sum of scores for the following three sub-categories: (i) technical characteristics (TC) largely related to the design of the dam; (ii) existing conditions (EC) relating to the current condition of the dam; and (iii) safety plans for dam safety relating to the organizational and management set-up for dam safety assurance. Each of these three categories is sub-divided into more detailed risk factors as shown in the TN for RI.

The potential consequence /hazard is also sub-divided into three factors: (i) threat to life safety characterized by Population at Risk (PAR); (ii) environmental impacts; and (iii) socio-economic impacts.

Tier 1 initial risk screening may be sufficient for low-risk dams, i.e., relatively small dams with limited safety issues and lower potential hazard/consequences, whereas as High to Significant risk dams with major dam safety issues and high hazard/consequences are likely to require the level of confidence that a Tier 2 or even Tier 3 assessment can provide. Much of the effort needed to conduct a Tier 1 assessment is similar to what may be expected of dam engineers performing dam safety inspection but its objective and consistent application for all dams is crucial.

Tier 2 Qualitative / Semi Quantitative Risk Assessment

Tier 2 risk assessment provides review and identification of potential failure modes and consequences in a qualitative or semi quantitative manner. Although it does not intend to fully characterize the risk in a probabilistic manner, it aims to identify the failure modes that are considered to pose significant credible risks for the dam and associated structures.

The risk, which is a function of failure likelihood/probability and consequence/hazard, is to be assessed based on available information, a technical site visits to the dam and working group sessions. The Potential Failure Mode Analysis (PFMA) should be undertaken by a group of qualified dam engineers with adequate knowledge of risks and failure mode analyses including dam owner and operator staff. The methodologies and procedures of the PFMA are detailed under the aforementioned TN 5 on PFMA.

The result of the Tier 2 risk assessment will provide a prioritized set of structural remedies and resilience enhancement measures to reduce identified risks as well as identify additional studies, investigations, surveillance, monitoring program, etc. for the portfolio of dams subject to Tier 2. The portfolio risk assessment and management process and results will be helpful in reviewing appropriate interventions and optimizing resources during project implementation.

Tier 2 dams may be selected based on the result of the Tier 1 risk screening or when the dam owner knows that the risk needs to be analyzed in more detail to support appropriate management actions. Where there is potential for very High risk, a more detailed Tier 3 assessment would be appropriate to address uncertainties and support management decisions.

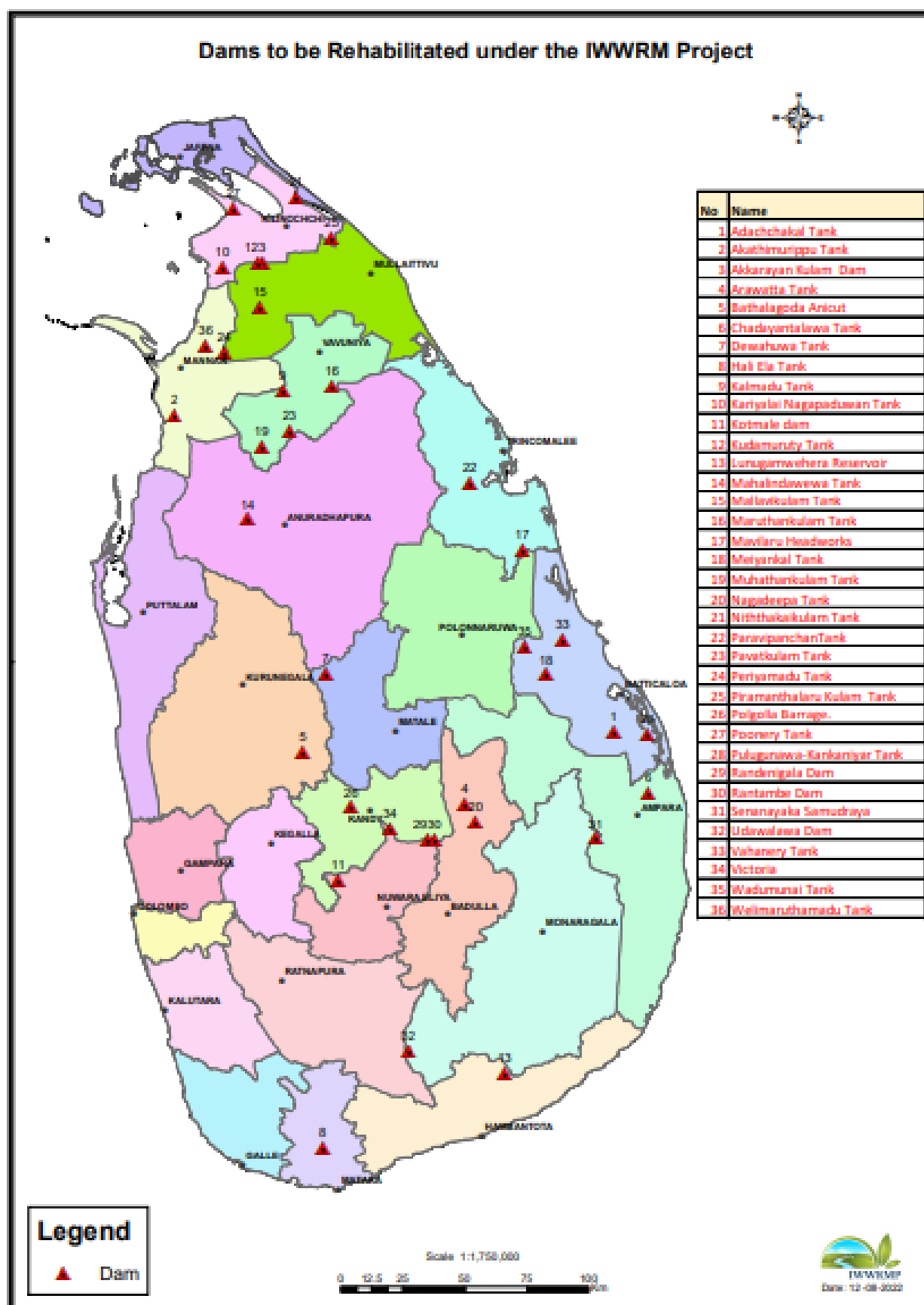
Tier 3 – Quantitative Risk Assessment

Detailed quantitative risk analyses in Tier 3 risk assessment provide a complete description of all risk and uncertainties by estimating the probability of dam failure and the resulting failure impacts /consequences. Both the probability of each of failure modes and corresponding consequences need to be assessed. The probabilistic evaluation of potential failure modes will assist in the identification of the main scenarios of dam failure driving the total risk. This level of analysis would entail the use of more complex models and more in-depth methods for identifying potential failure modes and the integration of these analyses within the overall assessment of risk.

The analytical results will be used to define prioritized sequences of proposed risk reduction measures. It will also assist in detailed assessment and design of priority remedial works. A Tier 3 assessment should be undertaken when risk issues have been identified at Tier 2 that justify moving to Tier 3. The extent of the analyses will vary and depend on the level of understanding and confidence desired for decision making, in particular when proposed solutions would involve quite complex and costly remedial works.

The results of the three-tiered risk assessment approach should guide the dam owners /authorities in classifying dams based on potential risks, i.e., likelihood/probability of dam failure and potential consequence or hazard of dam failure. The dam safety requirements including urgency of structural remedial works, level/scope of non-structural measures, intensity of quality control and supervision, etc. should be defined depending on risk classification of each dam.

In particular, it is essential to identify High to Significant risk dams and to allocate sufficient resources for undertaking urgent structural remedial works, enhanced non-structural measures, such as dam safety surveillance and monitoring programs, intensive quality control by the dam owners and due diligence by the WB. Further detailed risk classification methods and models are provided in the aforementioned GPN on Dam Safety.



Annexure 3

- ❖ Available Data Checklist of Irrigation Department
- ❖ Available Data Checklist of Mahaweli Authority of Sri Lanka
- ❖ Available Data Checklist of Provincial Irrigation Department – Eastern Province
- ❖ Available Data Checklist of Provincial Irrigation Department – Northern Province

Availability of data for Risk Dam Portfolio Risk Assessment - Irrigation Department

[illegible]

#	Required Documents for Dams' Risk Assessment	Kotmale Dam	Victoria Dam	Rantambe	Randenigala Dam	Polgolla Barrage	Udawalawe dam
1	Topography Data (1:10000) in 1m contour intervals	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
2	Rainfall Data & their stations	At Dam	At Dam	At Dam	At Dam	At Dam	At Dam
3	DEM availability with Resolution details	Not Clear	Not Clear	Not Clear	Not Clear	Not Clear	Not Clear
4	Availability of Satellite images/ Lidar Survey info	N/A	N/A	N/A	N/A	N/A	N/A
5	Surveying Documents (BTL Demarcation)	BTL Available	BTL Available	BTL Available	BTL Available	BTL Available	BTL Available
6	As built Drawings	Available	Available	Available	Available	Available	Available
7	Design Reports	Limited	Limited	Limited	Limited	Limited	Limited
8	Quality Control Reports during Construction	N/A	N/A	N/A	N/A	N/A	N/A
9	Instrumentation and Monitoring Records	Available	Available	Available	Available	Available	Available
10	Dam Safety Reports	Not Clear	Not Clear	Not Clear	Not Clear	Not Clear	Not Clear
11	Flood Records & damages	Available	Available	Available	Available	Available	Available
12	Dam Breach incident Records	No	No	No	No	No	No
13	Seepage incident Records	No	No	No	No	No	No
14	Operation & Maintenance Manual	Available	Available	Available	Available	Available	Available
15	Emergency Preparedness Plan/ Emergency Action Plan	Available	Available	Available	Available	Available	**
16	Technical details of the tank	Limited	Limited	Limited	Limited	Limited	Limited
17	River basin details	N/A	N/A	N/A	N/A	N/A	N/A
18	If any cascade system, technical details and operational informations	N/A	N/A	N/A	N/A	N/A	N/A
19	spillway discharge capacity	Available	Available	Available	Available	Available	Available
20	Downstream land use detail (building, agriculture &)	N/A	N/A	N/A	N/A	N/A	N/A
21	Downstream Population density	N/A	N/A	N/A	N/A	N/A	N/A
22	If any other data related to the study exist, Listed down	-	-	-	-	-	-

* Get from survey Department

** Only the Contact details are Available

Required Documents for Dams' Risk Assessment	Meiyankal Scheme	Pulugunawai-Kankaniyar scheme	Adachthakal tank	ParavipanchanTank	Chadayanthalawa Tank
Topography Data (1:10000) in 1m contour intervals	Nil	Nil	Nil	Yes	Nil
Rainfall Data & their stations	Yes	Yes	Yes	Yes	Yes
DEM availability with Resolution details	Nil	Nil	Nil	No	Nil
Availability of Satellite images/ Lidar Survey info	Nil	Nil	Nil	Yes	Nil
Surveying Documents (BTL Demarcation)	Yes	Yes	Yes	Yes	Yes
As built Drawings	Yes	Yes	Yes	Yes	Yes
Design Reports	Nil	Nil	Nil	Yes	Nil
Quality Control Reports during Construction	Yes	Yes	Yes	Yes	Yes
Instrumentation and Monitoring Records	Nil	Nil	Nil	No	Nil
Dam Safety Reports	Nil	Nil	Nil	No	Nil
Flood Records & damages	Yes	Yes	Yes	Yes	Yes
Dam Breach incident Records	Yes	Nil	Nil	Not Applicable	Nil
Seepage incident Records	Yes	Yes	Yes	Yes	Nil
Operation & Maintenance Manual	Nil	Nil	Nil	Yes	Yes
Emergency Preparedness Plan/ Emergency Action Plan	Nil	Nil	Nil	Yes	Yes
Technical details of the tank	Yes	Yes	Yes	Yes	Yes
River basin details	Yes	Yes	Yes	No	Yes
If any cascade system, technical details and operational informations	Nil	Nil	Nil	Not Applicable	Yes
spillway discharge capacity	Yes	Yes	Yes	Yes	Nil
Downstream land use detail (building, agriculture &)	Nil	Nil	Nil	Yes	Yes
Downstream Population density	Nil	Nil	Nil	Yes	Nil
Contour Plan and Area Capacity Diagram	Yes	Yes	Yes	–	Yes
LS & CS of Tank Bund	Yes	Yes	Yes	–	Yes
LS & CS of RB & LB channel	Yes	Yes	Yes	–	–
Nos of Farm Families	Yes	Yes	Yes	–	Yes
Maha & Yala Cultivation Details	Yes	Yes	Yes	–	Yes
Topography Data	Yes	Yes	Yes	–	Yes
Hydro Data	Yes	Yes	Yes	–	Yes

No	Required Document for Dams' Risk Assessment	Kalmanu Tank	Periyamadu Tank	Kudamuruty Tank	Akkaran Tank	Piramaru Tank	Poonery Tank	Niththakal Tank	Kariyalai Nagapaduwan Tank	Maruthankam Tank	Welimaruthamadu Tank	Mallavikulam Tank
1	Topography Data (1:10000) in 1m contour intervals	No	No	No	No	No	No	No	No	No	No	No
2	Rainfall Data & their stations	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	DEM availability with Resolution details	No	No	No	No	No	No	No	No	No	No	No
4	Availability of Satellite images / Lidar survey info	No	No	No	No	No	No	No	No	No	No	No
5	Surveying Documents (BTL Demarcation)	No	No	No	No	No	No	No	No	No	No	No
6	As built Drawing	No	No	No	No	No	No	No	No	No	No	No
7	Design Reports	No	No	No	No	No	No	No	No	No	No	No
8	Quality Control Reports during Construction	No	No	No	No	No	No	No	No	No	No	No
9	Instrumentation and Monitoring Records	No	No	No	No	No	No	No	No	No	No	No
10	Dam Safety Reports	Yes	No	No	No	No	No	No	No	No	No	No
11	Flood Records & damages	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	Dam Breach incident Records	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
13	Seepage incident Records	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14	Operation & Maintenance Manual	No	No	No	No	No	No	No	No	No	No	No
15	Emergency Preparedness plan/ Emergency action plan	No	No	No	No	No	No	No	No	No	No	No
16	Technical details of the tank	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
17	River basin details	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
18	if any cascade system, technical details and operational information	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
19	spillway discharge capacity	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20	Downstream land use detail (building, agriculture &)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
21	Downstream Population density	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
22	if any other data related to the study exist, listed down	-										


ENG. V. PREMAKUMAR
Director of Irrigation
Northern Province