RSAT
Rapid Basin-wide Hydropower Sustainability Assessment Tool

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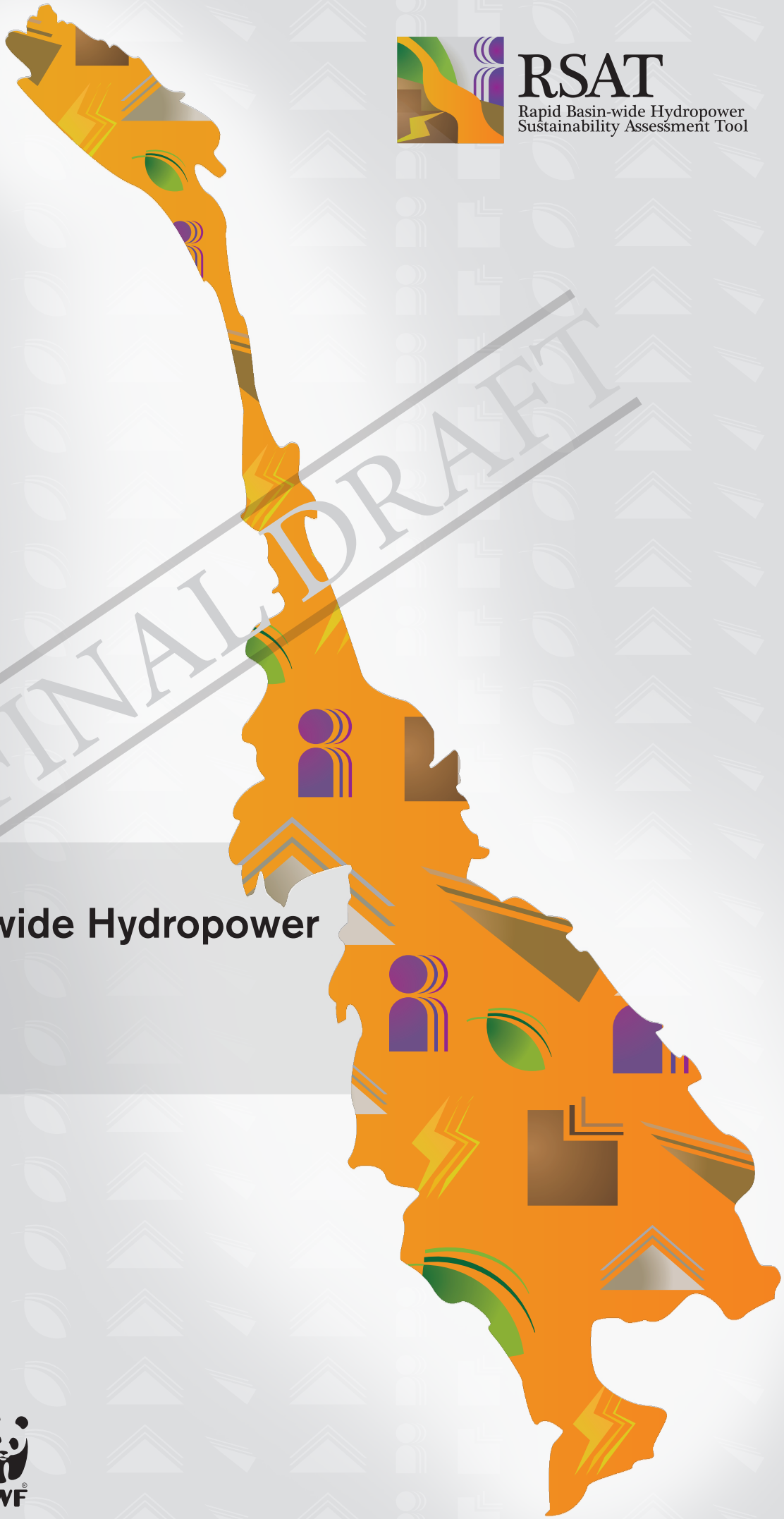

Joint Initiative

MEKONG RIVER COMMISSION FOR SUSTAINABLE DEVELOPMENT
MRC
ADB
WWF

Design: Mark Turgesen Photos: MRC Archives

RSAT

Rapid Basin-wide Hydropower Sustainability Assessment Tool

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Abbreviations and Acronyms

ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
BDP	Basin Development Plan
CDM	Clean Development Mechanism
CA	Concession Agreement
CIA	Cumulative Impact Assessment
DSMS	Dam Safety Management System
ECSHD	Environmental Considerations for Sustainable Hydropower Development
EFA	Environmental Flow Assessment
ESIA	Environmental and Social Impact Assessment
EPP	Emergency Preparedness Plan
IPP	Independent Power Producer
IWRM	Integrated Water Resource Management
MOU	Memorandum of Understanding
MDG	Millennium Development Goals
MRC	Mekong River Commission
NGO	Non- Government Organisation
PES	Payment for Ecological Services
PDA	Power Development Agreement
PDP	Power Development Plan
PPA	Power Purchase Agreement
RBO	River Basin Organization
RBC	River Basin Committee
RSAT	Rapid Basin-wide Hydropower Sustainability Assessment Tool
SEA	Strategic Environmental Assessment
SIA	Social Impact Assessment
SWOT	Strengths, Weaknesses, Opportunities and Threats
TNC	The Nature Conservancy
WCD	World Commission on Dams
WWF	World Wide Fund for Nature
UNFCCC	United Nations Framework Convention on Climate Change

Preface

The Environmental Considerations for Sustainable Hydropower Development (ECSHD) is an initiative established in 2006 to develop tools that will support planning and decision making for sustainable hydropower development in the Mekong River Basin. The ECSHD consists of the Asian Development Bank (ADB), Mekong River Commission (MRC) and World Wide Fund for Nature (WWF).

The Rapid Basin Wide Hydropower Sustainability Assessment Tool (RSAT) has been developed to assess hydropower sustainability within an IWRM based framework. A period of piloting early drafts of the RSAT in the Mekong region was conducted from May 2010 to December 2011. The RSAT piloting process included representatives from Lao PDR, Thailand, Cambodia and Vietnam from national and provincial government agencies, hydropower developers and operators, river basin organisations, universities, community groups and NGO's. The pilot process visited six lower Mekong sub-basins and included over 100 lower Mekong stakeholders.

This version of the RSAT has been significantly shaped by the regional experience and expertise of the pilot participants and the feedback they provided on the early drafts of the tool. The MRC's Initiative for Sustainable Hydropower is committed to a program of implementation of the RSAT from 2012-2015 in the Mekong region. The RSAT provides a framework and methods to apply IWRM principles to sustainable hydropower development. Application of the tool is intended to support the lower Mekong governments to achieve their strategic priorities relating to IWRM and sustainable hydropower development as identified in the Mekong IWRM Based Basin Development Strategy 2011. See http://www.mrcmekong.org/assets/Publications/strategies-workprog/BDP-Strategic-Plan-2011.pdf.

Although the RSAT has its origins in the Mekong Region it can be adapted for use in any region of the world. The RSAT is available as an open source tool with no restrictions on its use and it is hoped that stakeholders from other regions will also use the RSAT to advance sustainable hydropower development in their respective regions.

PART 1: OVERVIEW OF THE RSAT

Introduction

The RSAT is a multi-stakeholder dialogue and assessment tool designed to assess hydropower development and management issues at a basin wide level. Hydropower sub-basins often host multiple projects that are at different stages of development. Placing hydropower in a basin wide context requires looking beyond individual projects to take a broader integrated approach to planning and management, following the principles of IWRM. In any hydropower sub-basin there are a number of government, private sector and other institutions and stakeholder groups with various roles, responsibilities and interests. Sustainable hydropower and water resource development depends on the capacity and performance of each of these key stakeholder groups and their level of collaboration and interaction with each other. The RSAT is designed to support collaborative and integrative planning and decision making processes and dialogue amongst key stakeholder groups.

There are international conventions and agreements for transboundary river basin management (e.g. 1995 Mekong Agreement) and globally accepted principles for IWRM. In the past decade there have been a number of performance standards and assessment tools developed for hydropower sustainability. The RSAT content brings together accepted good practice principles for sustainable hydropower development, river basin management and IWRM into one integrated tool that is tailored to the Lower Mekong hydropower development context.

The RSAT has been developed in response to needs identified in the Mekong region which is currently experiencing rapid and large scale hydropower development where sub-basins often have multiple projects at different stages of development. Focus is therefore placed not only on hydropower projects but on the broader context of energy sector and water resource planning and management at sub-basin, national and transboundary levels.

RSAT Principles

The RSAT is underpinned by key sustainability themes and principles which are described below.

Co-operation in international river basins
The RSAT has its origins in the Mekong region and is therefore focused on the sustainable development needs of an international river basin. The RSAT includes considerations of

IWRM AND ITS RELATIONS TO SUB-SECTORS

Who are the key stakeholder groups for hydropower development and IWRM?

The key stakeholder groups for hydropower development and IWRM that can benefit from the use of the RSAT are:

- National government ministries, agencies and regulatory authorities from the energy and water sectors and other relevant sectors
- Government power utilities
- Hydropower developers and operators and their consultants – private and public sector
- Provincial and local government agencies and administrative bodies across different sectors
- River basin organisations
- Representatives of affected communities, resource user groups and broader basin populations
- Transboundary and regional institutions
- NGO's and research institutions
- Investors and funding organisations

transboundary and sub-national cooperation for river basin and hydropower planning and management. International co-operation for river basin management and infrastructure development is a challenging and long term process that requires a diversity of mechanisms for communication, notification, and negotiation to achieve optimal development outcomes. Integrating river basin planning and hydropower regulatory and management frameworks Sustainable hydropower development requires a high level of integration between water resource and energy sector planning and the hydropower regulatory and management frameworks. Water resource management and hydropower development are often the responsibility of separate government agencies. Communication, joint planning, co-ordination and data sharing mechanisms are required between these agencies to ensure that hydropower development occurs within an IWRM framework.

Ensuring robust governance for sustainable development at all levels

Sustainable hydropower development requires a transparent and accountable system of governance applied at all levels from local to international. Governance includes regulatory frameworks, national policies, plans, laws and the various institutions with roles and responsibility for water and energy planning and management at different levels. Regulatory frameworks, policies and plans must be supported by institutions with adequate capacity and effective implementation and enforcement mechanisms, including conflict resolution mechanisms. A key theme in the RSAT is the importance of multiple levels of governance from local to international, and how those levels interact with each other.

Collecting baseline data to inform decisions and measure change

River basins that host one or more hydropower projects experience a number of alterations and pressures on natural and social systems in addition to pre-existing pressures. The collection of basin wide baseline data to inform planning and decision making and to enable the measurement of change enables an evidence based approach to managing risk and optimising development outcomes.

Using collaborative and multi-disciplinary approaches to options assessment and hydropower siting and design

Options assessment studies and siting and design processes require multi-disciplinary, transparent and consultative approaches to optimise development outcomes at the sub-basin level and identify and manage risks. In sub-basins where there are multiple hydropower projects or private sector developers, government has an important role to play in the optimisation of development options for new and existing project sites.

Engaging stakeholders and protecting rights and entitlements

Stakeholders affected by and hosting hydropower development, should have access to planning and decision making processes. Some examples include representative committees, disclosure of information and participatory planning processes. Hydropower planning and decision making should maximise opportunities to benefit society and address social risks to ensure that no-one in the basin is worse off as a result of hydropower development.

Equitably sharing the benefits and costs of development

Development of electricity infrastructure is intended to benefit broader society and improve the quality of life of basin residents through the provision of electricity and/or revenue generation in the case of export projects. The intention of benefit sharing is to ensure equitable resource use by distributing the costs and benefits of hydropower equitably to river basin residents and across the economy to contribute to broad-based growth and to support social equity policies. Communities and natural systems in a hydropower sub-basin that bear the negative impacts of hydropower development should be amongst the first, not the last to receive the benefits.

Addressing poverty and food security in hydropower basins

Poverty alleviation and food security are explicit objectives of economic growth and development; of equal importance to water and energy security. They should therefore be prioritized in hydropower and water resource development planning. Hydropower projects can contribute to improved food security and poverty alleviation through the provision of improved water and energy services and economic spin offs from development. Conversely hydropower development has the potential to exacerbate poverty and have a negative impact on food security if risks are not carefully identified and managed.

Maintaining basin wide ecosystem integrity

Hydropower projects can significantly alter ecosystems from their pre-existing state and careful scientific assessment of impacts and use of avoidance, mitigation and off-set measures is required to maintain the integrity of ecosystems in the sub-basin for the benefit of current and future basin populations. The maintenance of biodiversity and ecosystem connectivity at a basin level is therefore an integral part of hydropower planning and decision making.

RSAT Topics and criteria

The RSAT consists of a framework of 10 topics and 27 sub-topics (see Table 1). The topics have been selected as a result of research since 2006 and reflect the core sustainability principles of the RSAT. The development of RSAT content has included research into hydropower sustainability and IWRM, various safeguards and international standards as well as the inputs of various stakeholders that have contributed to the development and trialing of the tool in the Mekong region.

Each sub-topic consists of four criteria as listed below. The intention of the four criteria is to provide a framework of analysis for each topic from the perspective of four key areas of responsibility relevant to hydropower development and IWRM. A description of the four RSAT criteria is below:

Four RSAT criteria

A. River Basin Planning and Management – focuses on the IWRM-based principles and practices in river basin planning and management across sectors and the collection of basin wide baseline data to inform planning and decision making and monitor change.

B. Energy / Power Sector Planning and Regulation – focuses on power sector planning and regulation, emphasizing hydropower planning and management. This criterion also focuses on the integration between power planning and water resource planning.

C. Hydropower Projects – focuses on the combined plans, studies and management actions of all hydropower developers and operators in the basin at all stages of the project cycle (project identification, selection, planning, design, construction and operation). This criterion also provides a focus on how different projects co-ordinate with each other and other water users in the basin.

D. Regulatory and Governance –focuses on the regulatory and planning frameworks for hydropower development and water resource management at different levels from local to international and how they are enforced and implemented in practice.

Performance statements

Each criterion consists of two or three qualitative performance statements that describe the various aspects of sustainable hydropower development and IWRM relevant to the sub-topic. Evidence is assessed against performance statements. An example is given below for sub-topic 7.1, Criterion C. Hydropower projects.

7.1 Multiple water use optimisation and efficiency

C. Hydropower projects – Hydropower feasibility studies are consultative and seek to enhance design and operational opportunities for multiple-use where feasible. Hydropower projects co-ordinate with other agencies and water users in the operations stage to achieve agreed multiple-use objectives.

TABLE 1: SUMMARY OF RSAT TOPICS AND SUB-TOPICS

TOPIC 1 Institutional capacity	
1.1	Transboundary institutional capacity
1.2	National to local institutional capacity
1.3	Water and energy sector integrated planning
TOPIC 2 Options assessment, siting and design	
2.1	Demonstrated need and options assessment
2.2	Siting and design for basin wide sustainable development
TOPIC 3 Economic contribution of hydropower	
3.1	National economic and financial analysis
3.2	Transboundary economic analysis
TOPIC 4 Equitable sharing of hydropower costs and benefits	
4.1	Transboundary benefit sharing
4.2	National to local benefit sharing
4.3	Financing ecosystem protection and other measures
TOPIC 5 Social issues and stakeholder consultation	
5.1	Stakeholder identification and consultation
5.2	Assessment and management of basin wide social impacts
5.3	Food security and poverty alleviation
5.4	Indigenous peoples and ethnic minorities
TOPIC 6 Environmental management and ecosystem integrity	
6.1	Assessment and management of basin wide environmental impacts
6.2	Biodiversity conservation and ecosystem integrity
TOPIC 7 Flows and reservoir management	
7.1	Multiple water use optimisation and efficiency
7.2	Reservoir planning and management
7.3	Co-ordinated hydropower operations
7.4	Downstream and environmental flows
7.5	Flood and drought management
TOPIC 8 Erosion, sediment transport and geomorphological impacts	
8.1	Sediment baseline and impact assessment
8.2	Management of impacts and sediment resources
TOPIC 9 Management of fisheries resources	
9.1	Fisheries baseline and impact assessment
9.2	Management of impacts and fisheries resources
TOPIC 10 Dam and community safety	
10.1	Dam safety
10.2	Community safety and emergency response

Why conduct an RSAT assessment?

The RSAT is a flexible tool that can be used to meet a number of different needs and objectives in a sub-basin with proposed or existing hydropower development or a mix of both. An RSAT assessment will help to identify gaps, risks and the key institutional responses and management strategies that can be adopted for sustainable development in a hydropower sub-basin.

An RSAT assessment can be conducted within organisations or as a multi-stakeholder assessment process that brings together groups with key responsibilities and interests in the sub-basin (e.g. developers, government agencies, river basin organisations). The objectives of the assessment will vary, depending on the development context and will be identified during the assessment establishment and preparation stage. Examples of objectives for RSAT assessments are listed below:

Examples of RSAT assessment objectives:

- To identify gaps in data, regulatory frameworks, institutions and on-ground practices
- To identify the development risks, opportunities and priority issues in the basin within a structured framework
- To inform the scope of cumulative and strategic impact assessment studies
- To inform studies to optimise development outcomes in a sub-basin
- To assist river basin organisations to engage in the hydropower planning and management process and develop action plans based on identified priorities
- To assist water and energy planners to identify needs and opportunities for collaboration and co-ordination
- To inform the development of a watershed management strategy in a hydropower sub-basin
- To monitor hydropower sustainability performance in a sub-basin
- To establish dialogue and collaboration between different hydropower and river basin stakeholders
- To conduct capacity building or training in hydropower sustainability or IWRM
- To assess transboundary arrangements for hydropower development

Benefits of RSAT use for different stakeholder groups

GOVERNMENT AGENCIES AND UTILITIES

- INSTITUTIONAL AND DATA GAP ANALYSIS
- INFORM SUB-BASIN OPTIMISATION STUDIES FOR HYDROPOWER
- SUPPORT IMPROVEMENT IN APPLYING IWRM
- INFORM CO-ORDINATION BETWEEN AGENCIES
- SCOPE STRATEGIC AND CUMULATIVE IMPACT ASSESSMENTS
- IDENTIFY PRIORITY ISSUES IN A SUB-BASIN
- SUPPORT STAKEHOLDER DIALOGUE

PROVINCIAL AND LOCAL GOVERNMENT AND ADMINISTRATIVE BODIES

- IDENTIFY LOCAL AND PROVINCIAL HYDROPOWER RISKS AND OPPORTUNITIES
- ASSESS BENEFIT SHARING ARRANGEMENTS
- IMPROVE PROVINCIAL AND LOCAL CAPACITY TO ENGAGE IN HYDRO-POWER PLANNING PROCESSES

HYDROPOWER DEVELOPERS, OPERATORS AND THEIR CONSULTANTS

- RISK ASSESSMENT IN A BASIN
- DUE DILIGENCE
- INFORM SITING AND DESIGN
- STAKEHOLDER ENGAGEMENT AND DIALOGUE
- INFORM WATERSHED MANAGEMENT STRATEGY

RSAT
Dialogue
Analysis
Action Planning
Monitoring

RIVER BASIN ORGANISATIONS (RBO'S)

- SUPPORT RBO ESTABLISHMENT AND MANAGEMENT
- ASSESSMENT OF BASIN RISKS AND OPPORTUNITIES FOR HYDROPOWER
- GAP ANALYSIS – DATA, INSTITUTIONAL
- CAPACITY BUILDING
- BASIN HYDROPOWER STATUS REPORTS
- INFORMING COLLECTION OF BASIN DATA
- INFORM RIVER BASIN PLANNING AND MANAGEMENT FOR HYDROPOWER

AFFECTED COMMUNITIES, BENEFICIARIES AND RESOURCE USER GROUPS

- BUILD CAPACITY TO ENGAGE IN PLANNING PROCESS
- IMPROVE UNDERSTANDING OF BASIN PLANNING AND HYDROPOWER DEVELOPMENT PROCESS
- IDENTIFY COMMUNITY PRIORITY ISSUES AND ACTIONS

MEKONG RIVER COMMISSION

- CAPACITY BUILDING AND DECISION SUPPORT
- SUPPORT BASIN DEVELOPMENT STRATEGY STRATEGIC PRIORITIES
- SUPPORT REGIONAL AND NATIONAL PROCESSES

BANKS AND INVESTORS

- FINANCIAL AND REPUTATIONAL RISK ASSESSMENT AT BASIN LEVEL
- INVESTMENT RISK EVALUATION
- CONSIDERATION OF CUMULATIVE IMPACTS

The RSAT assessment process

The RSAT includes a range of assessment methods to enable a flexible approach depending on the assessment objectives and the needs and capacity of the institutions involved in the assessment. The RSAT assessment methods are designed primarily for group work and are suitable for participants with both technical and non-technical backgrounds. When a multi-stakeholder group is conducting the assessment a facilitator will help to support to the multi-stakeholder dialogue process.

RSAT Assessment methods

The RSAT Assessment Guide provides guidance on the RSAT assessment methods. It is hoped that over time groups using the RSAT will continue to improve and develop new assessment methods. The core RSAT assessment methods include:

Multi-criteria gap analysis – evidence is collected and analysed against the RSAT topics, criteria and qualitative performance statements that are designed to provide a basin wide framework for assessment of sustainable hydropower development. The analysis will identify gaps and priority issues in the sub-basin and assist to identify relationships between the various aspects of development.

SWOT analysis – based on the RSAT topics and criteria and the available data and information for the basin, assessment participants conduct a SWOT analysis for each topic.

Action planning – based on the results of the multi-criteria and SWOT analysis the group identify technical, institutional and management responses that can be adopted to improve the level of sustainability performance and address key gaps and risks in the sub-basin.

Institutional mapping and gap analysis – based on the RSAT topics and the available data and information for the basin, assessment participants conduct a basic institutional mapping exercise.

There are five stages to an RSAT dialogue and assessment process

Establishment stage: A sub-basin for assessment is selected and preliminary scoping is conducted to determine the objectives of the assessment and identify key stakeholder groups to participate.

Preparation stage: People are assigned to gather data and information for each topic and conduct preliminary research into the basin and its priority issues. Key stakeholders will be consulted to provide assessment inputs and data. The preparation stage includes selecting assessment methods, organising logistics, appointing a facilitator and preparing for the assessment process. The "RSAT Assessment Guide" and a range of user resources are available to assist with assessment preparation; they include guidance notes, checklists, templates and other resources.

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Assessment stage: The group assessment and dialogue process takes place over a period of approximately five days and is usually led by a facilitator. The RSAT assessment should take place at a location within the sub-basin and include a field visit either before or during the assessment. For each topic, data is presented and the group use the RSAT sub-topics, criteria and assessment methods to discuss, share knowledge and information and analyse the different aspects of development. Depending on the objectives of the assessment and the methods used, outputs may include the identification of risks and opportunities, a series of priority actions, a ranking of sustainability performance or a gap analysis report.

Reporting stage: The assessment results and outputs are presented in a report and the outcomes of the assessment are reported to the institutions responsible for follow up actions.

Follow up stage: Follow up actions and further dialogues are progressed by responsible stakeholder groups as identified during the assessment.

About this document

The following section (Part 2 of this document), provides the detailed RSAT framework of topics, sub-topics and criteria. The RSAT Assessment Guide (Part 3 of this document) provides an overview of how to prepare for and conduct an RSAT assessment and dialogue process.

Where to find more information

A range of resources to support different user groups are available on the MRC website. An RSAT Summary Document is available and provides a quick guide to the RSAT including an easy to read overview of the RSAT topics. An RSAT Q&A document provides answers to common questions regarding the RSAT. Additional resources, detailed assessment preparation checklists and templates, training materials and information on the RSAT will be posted on the MRC website as they become available.

Visit - **http://www.mrcmekong.org/**

PART 2: RSAT TOPICS AND CRITERIA

TOPIC 1
Institutional capacity

This topic addresses the level of institutional capacity amongst the various institutions and groups with responsibilities and interests relating to water resources and hydropower development. The topic includes evaluation of the legal and planning frameworks and how they are applied in practice.

The intent is that there is adequate institutional capacity and co-ordination between water resource planning and management and hydropower development to enable the delivery of balanced and equitable hydropower development outcomes in a basin wide context.

1.1 Transboundary institutional capacity

A. River basin planning –
A transboundary river basin organisation (RBO) exists within an agreed framework for transboundary basin cooperation and information collection and storage. Procedures and mechanisms exist for countries to notify and consult for hydropower projects on international rivers. Countries comply with their obligations and consult in good faith.

B. Energy / power sector planning and regulation –
National energy agencies and regulatory authorities are represented in transboundary basin planning processes.

C. Hydropower projects –
Studies relating to hydropower projects on international rivers are implemented within agreed frameworks for transboundary co-operation. In the operations stage, transboundary communication and co-ordination is evident.

D. Regulatory and governance –
National laws and regulations are compatible with regional and international agreements, plans and policies and include provision for transboundary impact assessment and consultation for projects on international rivers; regulations are enforced.

1.2 National to local institutional capacity

A. River basin planning –
A national and provincial river basin planning and management framework exists and includes broad stakeholder participation across sectors. Arrangements for data management and sharing, conflict resolution and co-ordination mechanisms exist and include stakeholders from local to national levels.

B. Energy / power sector planning and regulation –
National energy planning and regulatory agencies operate within a national sustainable development policy framework. Mechanisms for cross sectoral co-ordination to address sustainability considerations of hydropower exist at all project stages.

C. Hydropower projects –
Hydropower projects comply with relevant national laws and regulations at all project stages and disclose relevant data and reports. Risk and impact assessment studies are informed by adequate baseline data, apply the precautionary principle and are consultative. Management plans are implemented and their performance is measured.

D. Regulatory and governance –
A national policy and regulatory framework for hydropower that promotes sustainable development and IWRM principles exists and is implemented. Responsible agencies have the capacity to implement and enforce hydropower and related policies, plans and regulations for new and existing projects. Capacity building plans exist to address gaps.

1.3 Water and energy sector integrated planning

A. River basin planning –
RBO's, national and provincial water resource agencies and water user groups exist and are consulted in hydropower planning studies, impact assessment studies and the design and implementation of mitigation plans and operating rules for projects.

B. Energy / power sector planning and regulation –
Trade-offs and synergies between water and energy sectoral plans in the basin are identified in power development plans and addressed in the ranking of development options. Hydropower operating rules are institutionalised into water allocation policies and procedures in the basin.

C. Hydropower projects –
Hydropower projects are represented in river basin planning and management processes and share data and information at all project stages. Hydropower projects collaborate with other basin stakeholders on IWRM including environmental and social management and monitoring programs for the basin.

D. Regulatory and governance –
Regulatory and planning frameworks include the allocation of roles, responsibilities and mechanisms for integrated water and energy planning for hydropower, including requirements for co-operation, consultation and information sharing. Mechanisms exist to ensure policies and plans made by energy and water ministries and RBOs are aligned.

TOPIC 1
Guidance Notes and Definitions

■ **Examples of evidence** – National legislation, policy and regulations; RBO governance framework; budgets and resourcing plans for line agencies and RBOs; Transboundary procedures, e.g. data sharing, notification; evidence of meetings; hydropower plans, SEA reports, monitoring and auditing reports; compliance reports; hydropower monitoring reports and CSR policy; hydropower agreements (PDAs and PPAs) and MOUs; national policies relevant to hydropower; capacity building plans for line agencies and RBOs.

■ **Transboundary RBO** – an inter-government agency formed between national governments sharing a river basin to facilitate co-operation for river basin planning and management. Members may include all or some states sharing the river basin.

■ **Procedures for transboundary water management** – examples from the Mekong region include Prior Notification and Prior Consultation Agreement (PNPCA, Procedures for Water Quality, Procedures for Maintenance of Flow on the Mainstream.

■ **Project agreements** – examples include Memorandum of Understanding (MOU), Power Development Agreement (PDA), Power Purchase Agreement (PPA), and Concession Agreement (CA).

■ **Transboundary water use agreements** – an agreement signed between countries sharing a river basin which provides a mutually agreed framework for co-operation on international rivers, e.g. the 1995 Mekong Agreement.

■ **Hydropower planning studies** – include options assessment, basin hydropower master plans, ranking and optimisation studies, feasibility studies, cost benefit analysis and project financial viability models.

■ **Institutional capacity** – in the context of hydropower and IWRM relates to the capacity of the various institutions at different levels from transboundary to local and the regulatory and planning framework that they operate within to deliver sustainable water and energy development outcomes in a predictable, responsible, equitable and timely way. Examples include – cross sectoral co-ordination, clear allocation of roles and responsibilities, adequate human and financial resources in government agencies, monitoring and evaluation processes in the planning cycle.

■ **Transboundary ESIA** – an assessment of impacts that may occur outside national borders of the country hosting a hydropower project or group of projects.

■ **Mechanisms for cross border co-operation** - examples include RBO, committees, transboundary agreements, agreed procedures for notification and consultation.

■ **Integrated Water Resources Management (IWRM)** – a process which promotes the coordinated development and management of water, land and related resources in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital eco-systems.

■ **International policies/plans and national commitments for basin development include:** basin plans, sub-basin plans, provincial or municipal plans, sector or sub-sector plans; national policy frameworks and development targets (for relevant sectors); the 1995 Mekong Agreement/procedures/guidelines; other relevant regional/international conventions or agreements (e.g. Millennium Development Goals, RAMSAR/CITES, United Nations Framework Convention on Climate Change (UNFCCC), Greater Mekong Subregion (GMS), 1997 United Nations Convention Agreements related to hydropower considerations); and national legislation and regulations.

TOPIC 2
Options assessment, siting and design

This topic addresses the demonstrated need for hydropower development in the basin and the assessment of water and energy services options and alternatives. It addresses siting and design processes for hydropower projects.

The intent is that the need for hydropower projects and the services they provide can be demonstrated in regional, national and provincial development plans and that hydropower planning includes comprehensive analysis of options and alternatives for water and energy service provision. The intent also is that siting and design processes result in optimal development outcomes.

2.1 Demonstrated need and options assessment

A. River basin planning –
An assessment of all water resource development options and alternatives in the basin to meet needs for water services has been conducted in a consultative manner. Hydropower projects selected for development are a strategic fit with the need for water services in the sub-basin.

B. Energy / power sector planning and regulation and regulation -
The need for hydropower to meet energy and water services has been assessed and can be demonstrated in national and regional objectives, policies and plans. An assessment of hydropower options and alternatives to meet demonstrated needs has been conducted. Hydropower can be demonstrated as the preferred option in the electricity supply generation mix and to meet water services.

D. Regulatory and governance –
National laws and regulations include requirements for strategic environmental and social assessment of energy and hydropower options and the investigation of alternatives for energy and water services. Laws and regulations are enforced. Energy security, least cost supply considerations and fuel risks are explicitly managed in national planning processes.

2.2 Siting and design for basin wide sustainable development

A. River basin planning –
Siting and design is conducted within a basin wide planning framework informed by adequate baseline data and in consideration of multiple project optimisation and cumulative impacts. Systematic and ongoing monitoring is conducted to fill key knowledge gaps. Performance and change is measured against baselines.

B. Energy / power sector planning and regulation –
Multi-criteria options assessment and optimisation studies for one or more projects address basin wide sustainability criteria for all projects (new and existing) in the basin. Studies are updated as more detailed information becomes available from feasibility and ESIA studies and monitoring programs. The sites and project configurations selected for development have avoided significant risks and addressed a number of sustainability criteria and technical risks at both the basin wide and project level.

C. Hydropower projects -
Siting and design has used appropriate expertise and baseline data. It has addressed a number of technical risks and sustainability criteria. Siting and design mitigation measures have been implemented to address identified risks, their performance is monitored.

D. Regulatory and governance –
Guidelines for hydropower siting, design and operational mitigation measures have been developed; compliance provisions are included in project level agreements and are enforced consistently across the basin.

TOPIC 2

Guidance Notes and Definitions

- **Examples of evidence** – options assessment studies; Integrated Water Resource Management (IWRM) plans; hydropower project pre-feasibility or feasibility studies; basin development plans; hydropower master plans national power development plans, strategic and cumulative impact assessment studies; national or regional development plans or policies,

- **Design mitigation measures** – examples include multi-level off takes, fish passage structures, navigation locks, sluice gates, reservoir design and full supply level, re-regulation ponds, fish friendly turbines, reservoir flood storage capacity, reservoir and river bank protection measures in project design, oxygenation plants, transmission line and road route selection

- **Operational mitigation measures** – examples include ramp down rates, reservoir operating levels, water releases for sediment flushing, sediment dredging, environmental flow release, downstream warning and notification systems

- **Timely consultation** – means that consultation on the project siting and design takes place at an appropriate time in the project cycle to enable informed planning and decision making and within a reasonable timeframe for all parties involved.

- **Options assessment** – Energy options assessment is a process to assess options and alternatives to hydropower in the energy mix to meet the energy demand, need for ancillary services or to earn export revenue in basins where electricity is exported. Project options assessment is a process to assess options and alternatives to different project sites and designs.

- **Energy services** – examples include provision of electricity to domestic or export markets; provision of grid stability; provision of peak load; provision of ancillary benefits such as spinning reserve, system regulation and improved efficiency.

- **Water services** – examples include water storage, flood management, regulation of flow, irrigation supply, navigation, water supply, water for fisheries and floodplain agriculture

- **Energy Options**– examples include energy efficiency measures, increased efficiency in existing generation facilities, different types of energy such as thermal power or wind, no energy development, transmission and distribution options.

- **Energy options assessment criteria** – optimise resource use efficiency; energy payback ration; provision of ancillary services; optimise transmission efficiency; economic viability; minimise carbon intensity and greenhouse gas emission; reduce social and environmental costs.

- **Hydropower project options assessment criteria** – siting on tributaries instead of mainstream, multiple projects on one tributary as opposed to single projects on multiple tributaries, minimise the area flooded per unit of energy produced, prioritise alternatives that do not pose threat to vulnerable social groups; maximise multiple use opportunities, prioritise options that minimise population displacement; prioritise options that maintain connectivity in the basin for migrating species and sediment; avoid sites downstream of major sediment production zones; avoid impact to exceptional cultural heritage; avoid impact to threatened species and critical habitats;

- **Basin wide baseline data** – refers to data collected at scientifically selected locations in the basin for the purpose of understanding the basin wide natural, socio-economic and physical systems and interactions and to enable the measurement of change in the basin as a result of hydropower.

TOPIC 3
Economic contribution of hydropower

This topic addresses the economic contribution of hydropower development.

The intent is that hydropower projects have the financial capacity to meet all costs over the life of project and that hydropower development contributes a net economic benefit to regional and national economies.

3.1 National economic and financial analysis

A. River basin planning –
There is a baseline understanding of the social and economic value that water services provide to different sectors in the basin and their sensitivity to water allocation policy. Projects that are developed maximise national economic benefits and contribute to socio-economic development and poverty alleviation targets at national to local levels.

B. Energy / power sector planning and regulation –
The national Power Development Plan (PDP) contains economic analysis on the national and sectoral costs and benefits of hydropower development and addresses social and environmental risks. Regulatory and contract mechanisms secure long term government revenue streams for hydropower projects and cost efficiency in power generation and transmission.

C. Hydropower projects –
Projects meet performance targets for revenue generation, water management, electricity dispatch and asset condition. Projects meet commitments to fund social and environmental mitigation and compensation measures over the economic life of the project and have the financial capacity to address emerging issues.

D. Regulatory and governance –
Due diligence is undertaken to ensure the financial and technical capacity of project proponents and their investors, including their capacity to deliver agreed environmental and social mitigation measures. The economic contribution of hydropower is monitored and publicly disclosed.

3.2 Transboundary economic analysis

A. River basin planning –
A transboundary basin development planning process and associated studies address the role of energy, hydropower and water resources development in national and regional economic growth. Economic and other data is contributed by each national government.

B. Energy / power sector planning and regulation –
Transboundary economic analysis and SEA of hydropower development options on international rivers are conducted. The assessment of direct and indirect costs and benefits is conducted within a planning and consultation framework agreed by countries sharing the basin.

C. Hydropower projects –
Projects on international rivers that proceed to development stage are accepted at a regional and national level in each country as being reasonable and equitable within the context of international agreements and economic development plans for the basin.

D. Regulatory and governance –
A transboundary governance framework for regional cooperation on water and energy planning management exists. Progress towards basin and national economic development goals is regularly monitored and reported.

TOPIC 3
Guidance Notes and Definitions

■ **Examples of evidence** - regional economic integration plans , basin development strategy, sub-regional energy/development plans; hydropower development plan, ASEAN Charter, project feasibility studies, multiple use/optimisation studies, options assessment studies, consultation documentation with other sectors.

■ **Economic analysis** - is used to determine the costs and benefits of a project, policy or plan. CBA is usually a quantitative method that applies a monetary value to all project's costs and benefits. A project is assessed as economically viable if the benefits exceed its costs.

■ **Performance targets for water management** - includes compliance with reservoir level agreements, minimum flow releases, ramp down rates, minimum operating levels.

■ **Performance targets for asset condition** – refers to meeting performance targets set in project agreements for the condition of assets at the end of a concession period; compliance with asset management commitments and operation and maintenance schedules.

■ **Indirect costs and benefits** – examples include creation of new industries, employment and trade as a result of new roads and infrastructure, economic displacement after a time period as a result of changes to water availability, loss of community harmony or stability.

■ **Reasonable and equitable use of an international watercourse** – is use with a view to attaining optimal and sustainable utilization and benefits, taking into account the interests of the riparian States concerned and consistent with adequate protection of the watercourse. It includes the right to use the watercourse and the duty to co-operate in the protection and development of the watercourse.

TOPIC 4

Equitable sharing of hydropower costs and benefits

This topic addresses the sharing of hydropower costs and benefits from transboundary to local levels and includes different forms of benefit sharing.

The intention of benefit sharing is to ensure equitable resource use by distributing the benefits of hydropower equitably to river basin residents and across the economy to contribute to broader based growth and support social equity policies. The intent is that communities and jurisdictions where hydropower is located at all project stages are counted amongst the first to benefit from hydropower projects and not the last.

4.1 Transboundary benefit sharing

A. River basin planning –
A transboundary basin development plan or strategy provides a mutually agreed framework for riparian states to consult on transboundary cost and benefit sharing options. The plan includes provisions for assessment of hydropower development on international rivers or projects with impacts and benefits in more than one country, taking into account cumulative impacts.

B. Energy / power sector planning and regulation –
Options for regional grid interconnection and joint hydropower project ownership are assessed. Transboundary benefit sharing arrangements relating to hydropower agreed between riparian states are embedded in project level agreements.

C. Hydropower projects –
Assessment of transboundary cost and benefit sharing options, and target beneficiaries, is conducted for projects with impacts and benefits in more than one country within the national regulatory framework.

D. Regulatory and governance –
International obligations for risk and benefit sharing resulting from transboundary agreements are imbedded in national mechanisms and procedures and include monitoring and evaluation provisions.

4.2 National to local benefit sharing

A. River basin planning –
Basin wide planning includes provision for distribution of hydropower costs and benefits across sectors and communities in the host sub-basin. Specific plans exist for women, ethnic groups and other sub-groups to access benefits. The development contribution of benefits is monitored at the local level, using disaggregated data and is publicly disclosed.

B. Energy / power sector planning and regulation –
Monetary and non-monetary benefits from hydropower are distributed across sectors within a national to local policy and budget allocation framework. Communities in areas where hydropower projects are located are prioritised for rural electrification.

C. Hydropower projects –
Project benefits and forms of benefit sharing are assessed and selected in consultation with beneficiaries. Project level commitments for additional benefits and benefit sharing arrangements are funded and implemented over agreed timeframes. Hydropower projects have maximised opportunities to benefit communities in proximity to the project area, including through training, employment and capacity building programs.

D. Regulatory and governance –
Project agreements and regulatory mechanisms secure national revenues and provide for consistent distribution of socio-economic benefits from hydropower projects. Policy and planning approaches include provision to maximise local level benefits in hydropower sub-basins. Institutions and committees are established to ensure delivery of agreed benefit sharing measures and include reporting of expenditure and monitoring performance against benefit sharing targets.

4.3 Financing ecosystem protection and other measures

A. River basin planning –
Hydropower revenue and other funding mechanisms e.g. Payment for Ecological Services (PES) contribute to ongoing funding of environmental protection, natural resource management and social development projects in hydropower sub-basins. There is adequate resources and human capacity for environmental protection and natural resource management measures in the sub-basin.

B. Energy / power sector planning and regulation -
Assessment of opportunities for innovative financing including carbon financing (within the international framework) is conducted for hydropower development in the basin. National energy policy is in place to guide the allocation and expenditure of funds derived from carbon financing.

C. Hydropower projects –
Hydropower ESIA studies, management plans and financial studies assess financing options (including carbon finance) to address the financing of environmental mitigation measures and environmental off-set programs in the basin.

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D. Regulatory and governance –
A regulatory framework exists to secure sustainable financing from hydropower for a range of environmental off-set and watershed protection measures. Regulations are enforced; compliance and the effectiveness of measures are monitored by responsible authorities. Natural resource management and environment agencies have adequate financial and human capacity to deliver core functions.

TOPIC 4
Guidance Notes and Definitions

■ **Examples of evidence:** project economic assessments, benefit sharing agreements, regulations and policies, monitoring and audit reports, transboundary benefit sharing agreements and regulations, PES policies or incentive schemes, PES agreements, Clean Development Mechanism (CDM) applications/guidelines, policies, Carbon finance agreements, revenue allocation agreements.

■ **Examples of "Benefits" of hydropower development:**
Reliable and affordable electricity, flood and drought control, government revenue, energy security, economic development, investment in associated infrastructure, construction related employment and livelihood opportunities.

■ **Examples of "Costs" of hydropower development:** Loss of land and biodiversity resources to inundation, loss of critical aquatic habitats or species, reduced natural resource productivity e.g. fishery, opportunity cost to other sectors, loss of cultural heritage, food security risks.

■ **Types of benefit sharing mechanisms:**
Benefit sharing is a package of measures, not a single measure and is applied at different levels to meet different needs. The types of benefit sharing measures are:

Monetary benefits- e.g. revenue sharing, ongoing community development funds, tax revenue
Non-monetary benefits – e.g. water shed protection, reservoir fisheries and recreation

Project services – e.g. electricity and water services, flood and drought control
Additional benefits –associated with hydropower projects, e.g. roads, bridges, health clinics, improved housing and sanitation, schools, training and capacity building

Policy and planning approaches to maximise local level benefits – examples include procurement policies to favour local employment and use of local products and services during project construction; local training and capacity building programs; strategies to maximise local infrastructure development e.g. roads, bridges; policies to improve provision of social services in affected areas, e.g. schools, clinics.

■ **Examples of projects with impacts and benefits in more than one country include:**
electricity export / import projects; hydropower projects on international rivers with likely impacts on an upstream or downstream country; and hydropower projects on rivers that form national borders.

■ **PES Scheme**- payment for ecological services (PES) is a scheme whereby a group or individual dependent on a natural resource for its livelihood will pay another individual or group a sum of money to prevent damage to that natural resource. For example, a downstream community dependent on drinking water from a river paying upstream farmers not to use chemical fertilisers that would pollute the water.

TOPIC 5
Social issues and stakeholder consultation

This topic addresses the assessment and management of social and cultural impacts of hydropower development, including stakeholder identification and consultation, poverty alleviation, food security, livelihoods, population displacement and indigenous people.

The intent is that no people in the basin are worse off as a result of hydropower development.

5.1 Stakeholder identification and consultation

A. River basin planning –
Stakeholder mapping and analysis has been conducted for the basin to identify key stakeholder groups in relation to water resources and their use. Lines of communication amongst river basin stakeholders groups on river basin planning issues are institutionalised through mechanisms such as representative committees, RBOs and other relevant institutions.

B. Energy / power sector planning and regulation –
Energy and economic planning processes for hydropower are consultative and plans and project information are publicly disclosed.

C. Hydropower projects –
Hydropower ESIA's include a detailed stakeholder mapping based on risks and vulnerabilities associated with the project. Meaningful consultation processes are timely and two way at all project stages and address communication approaches and needs of impacted groups. Grievance mechanisms exist and are implemented.

D. Regulatory and governance –
Regulations include requirements for information disclosure and consultation with communities affected by hydropower projects at all project stages. Compliance with consultation requirements is monitored.

5.2 Assessment and management of basin wide social impacts

A. River basin planning -
Basin wide social baseline and regular monitoring is conducted and data is disaggregated. Basin wide cumulative assessment of water resource development scenarios is conducted and indicators are used to measure impacts in the basin. Trends in social well-being are monitored at the district and basin level and equitable improvement in social well-being in the basin can be demonstrated.

B. Energy / power sector planning and regulation –
National and regional energy planning by government agencies have prioritised the selection of hydropower sites that avoid or minimise population displacem ent.

C. Hydropower projects –
SIA studies and management plans are consultative, appropriately timed, publicly disclosed and informed by baseline data. They address social risks, including economic displacement in both the inundated and downstream areas and allocate of responsibility for implementation and monitoring. Plans to address social impacts, including resettlement plans are adequately funded and implemented in an equitable manner.

D. Regulatory and governance –
Regulations and policies for hydropower SIA, resettlement action plans and livelihood restoration exist and are enforced. The suitability of land allocated by authorities for resettlement is assessed in consultation with resettlement communities. Funds, resources and institutional responsibilities are allocated to implement and evaluate resettlement activities and livelihood restoration in all project stages. Independent arbitration mechanisms exist to resolve disputes.

5.3 Food security and poverty alleviation

A. River basin planning -
A basin wide baseline of income, food security, health and nutrition status exists. Data is disaggregated by gender and other social groupings. Social groups in hydropower sub-basins with low baseline social indicators experience a measurable and timely improvement in income, food security, nutrition and health status as a result of development.

B. Energy / power sector planning and regulation –
National and regional energy planning by government agencies have prioritised the selection of hydropower options that enhance food security and avoid significant risks to the nutrition status of the basin population.

C. Hydropower projects –
ESIA studies assess the impact and benefits of hydropower on poverty, nutrition, public health, education and food security status of women, men and children upstream and downstream of projects. Management plans specifically address social risks and the health, nutrition and livelihood status of project affected communities is monitored and publicly reported.

D. Regulatory and governance –
Poverty alleviation and food security policies and plans are in place that set binding targets and objectives at national and district levels and are implemented. Monitoring and evaluation of the implementation of these plans and regulations exists for water and energy development projects with regular public reporting.

5.4 Indigenous peoples and ethnic minorities

A. Basin planning -
Basin-wide socio economic data is disaggregated by ethnicity and gender. Data is available on indigenous people and ethnic minorities (hereafter indigenous people) and their reliance on land and water resources for livelihoods and cultural practices. The impact of water development scenarios, on indigenous men, women and children is assessed in water resource planning processes.

C. Hydropower projects –
Hydropower SIA studies and management plans include culturally appropriate good faith consultation with indigenous women and men. Indigenous people's plans are implemented and include effective grievance mechanisms for indigenous people to raise issues and receive feedback. Indigenous people give consent for the plans and aspects of the project that affect them directly.

D. Regulatory and governance –
The regulatory framework for hydropower includes requirements to consult with and assess impacts to indigenous men and women in project SIA's and develop indigenous people's action plans. The performance of Indigenous people's plans is monitored; grievance mechanisms are enforced and action is taken to address issues that arise.

TOPIC 5

Guidance Notes and Definitions

■ **Examples of evidence:** evidence of good faith negotiations, evidence of support Information provided to stakeholders – accuracy and quality of communication, watershed plans, and hydropower strategic communication.

■ **Disaggregated social data** – data that is separated by social sub-groupings for example, sex, age, ethnicity, income, education levels etc. Disaggregated data enables analysis of how certain interventions will affect certain sub-groups (e.g. men and women) differently.

■ **Social baseline data** - includes, household income, demographic data, cultural heritage, socio-economic condition, protein intake, health and nutrition status, access to water and sanitation, household assets and resources, access to natural resources, household food access and consumption, livelihood activities, land and water resource dependencies

■ **Equitable improvement in social well-being and socio-economic development** – refers to an improvement in social indicators and income status across all sub-groups in the sub-basin. The intention is that there is no increased disparity in the status of social sub-groups in the basin as a result of hydropower development and that the most disadvantaged sub-groups access development opportunities.

■ **Social risks include;** public health risks (e.g. HIV as a result of an influx of migrant workers during construction, increase in water borne diseases as a result of reservoirs, loss of domestic water supply due to water quality changes), livelihood risks (e.g. loss of income; decline in access to natural resources); safety risks (e.g. increased or unpredictable flooding, sudden water release) and cultural risks (e.g. loss of physical cultural heritage or cultural and spiritual values) Indigenous peoples and ethnic minorities is a term used in a generic sense to refer to a distinct, vulnerable, social and cultural group possessing the following characteristics in varying degrees: (i) self-identification as members of a distinct indigenous cultural group and recognition of this identity by others; (ii) collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories; (iii) customary cultural, economic, social, or political institutions that are separate from those of the dominant society and culture; and (iv) a distinct language, often different from the official language of the country or region. Meaningful consultation – is a process that (i) begins early in the project cycle; (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) is gender inclusive and responsive, tailored to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of affected people and other stakeholders into decision making such as project design, mitigation measures, the sharing of development opportunities and benefits, and implementation issues. Particular attention will be paid to the needs of disadvantaged or vulnerable groups, especially those below the poverty line, the landless, the elderly, female headed households, women and children, Indigenous Peoples and those without legal title to land. (ADB 2009).

■ **Consent** – refers to a collective expression by the affected Indigenous Peoples communities, through individuals and/or their recognized representatives, of broad community support for the project activities that affect them. Such broad community support may exist even if some individuals or groups object to the project activities. Other definitions of consent refer to a need for signed agreements with community authorised leaders or representatives of communities.

■ **Good Faith Engagement** – engagement that is undertaken with an honest intent to reach a mutually satisfactory understanding on the issues of concern.

■ **Cultural impacts include impacts to:** traditional/indigenous land and water use practices; physical cultural heritage sites, ceremonial; sacred and non-sacred rituals; religious; and spiritual connections to place; changes in systems of communication, transport and trading. These uses may be by indigenous or other ethnic groups in the basin.

■ **Public health risks include:** vector borne diseases (e.g. malaria, schistosomiasis) associated with water impoundments; loss of food resources and decline in nutritional status, communicable diseases; diseases introduced to remote communities by construction workforces; social and psychological disorders, water quality related health issues.

■ **Involuntary resettlement plan** - as a minimum, a re-settlement plan or agreement should include: project description; scope of land acquisition and re-settlement; alternatives considered; socio-economic information and profile of affected communities; information disclosure, consultation and participation; grievance re-dress mechanisms; legal framework; entitlements, assistance and benefits; relocation of housing and settlements; income restoration and rehabilitation; re-settlement budget and financing plan; institutional arrangements; implementation schedule; and monitoring and reporting of outcomes.

■ **Food security** - at the individual, household, national, regional and global levels [is achieved] when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.

TOPIC 6
Environmental management and ecosystem integrity

This topic addresses the identification and management of environmental impacts; the protection of biodiversity and ecosystem integrity across the basin.

The intent is that a basin-wide environmental baseline informs hydropower decision making and that hydropower is developed and managed in a way that maintains ecosystem integrity.

6.1 Assessment and management of environmental impacts

A. River basin planning –
Ongoing and systematic environmental baseline and regular monitoring is conducted in the basin to identify environmental changes and hotspots, and fill knowledge gaps associated with hydropower risks. Regular State of the Basin reporting identifies the environmental baseline condition, key pressures and trends in the basin. Environmental indicators are developed for hydropower and performance is measured.

B. Energy / power sector planning and regulation –
Strategic and cumulative environmental assessments are conducted for power development plans and hydropower master plans. Project agreements include provision for the ongoing identification and management of cumulative environmental impacts during the project life and the need for co-ordination with other projects in the basin to manage current and future environmental impacts.

C. Hydropower projects –
Hydropower projects apply a systematic approach to the identification, management and monitoring of environmental impacts at all project stages, using suitable expertise. Pre-project environmental baselines are established against which future change is measured. EIA's, environmental management plans and monitoring reports are publicly disclosed and implemented in a timely manner.

D. Regulatory and governance –
A regulatory framework for hydropower environmental impact assessment, management and monitoring exists and is enforced in a timely manner. Cumulative and basin wide environmental impacts, beyond individual project sites are considered in the regulatory and planning processes for hydropower and the environmental performance of hydropower is measured at the basin scale.

6.2 Biodiversity conservation and ecosystem integrity

A. River basin planning –
Basin-wide baseline data includes aquatic and terrestrial species abundance, biodiversity, habitat range, reproductive behaviour, and critical habitats. The impact of habitat modification and fragmentation and flow regulation on biodiversity is assessed. Strategies are developed in the hydropower planning processes to site, design and operate projects to maintain ecosystem connectivity at the basin level.

B. Energy / power sector planning and regulation –
Hydropower options and ranking studies aim to avoid project sites and designs that have significant negative impacts on biodiversity, environmental hot spots or protected areas.

C. Hydropower projects –
Biodiversity and ecological baseline data informs hydropower EIA studies. Project siting and design includes provisions for basin wide ecosystem connectivity and the avoidance and mitigation of significant impacts. Biodiversity off-set programs are implemented and include the protection of areas with equivalent values to those lost.

D. Regulatory and governance –
Policy and regulations for environmental protection exist and are enforced. Biodiversity conservation zones are legally protected from negative impacts. Compliance with off-set, management and compensation plans is enforced and action is taken to address issues that arise.

TOPIC 6
Guidance Notes and Definitions

■ **Examples of evidence** - strategic environmental assessments at the basin or sector level; hydropower/basin development options studies; initial environmental examinations and/or EIA for specific projects at the feasibility study stage; environmental management plans; basin-wide ecosystem studies and inventories; biodiversity management plans; habitat assessment studies; policies, regulations and agreements to protect biodiversity in the basin; national high value rivers policies, inventory of high value rivers and their biodiversity value, basin development plan/ IWRM plan; environmental monitoring reports and databases

■ **Environmental hotspot** - areas featuring exceptional concentrations of endemic species or biodiversity or providing key ecosystem services and are under threat from human activity. This may include critical habitats for threatened species, areas of key importance for maintaining livelihoods, wetland ecosystems.

High value tributaries are those that if left undeveloped and in a close to natural state will make a significant contribution to the overall ecosystem integrity and biodiversity of the river basin which may offset the loss of some tributaries to development.

■ **Environmental indicator** - An environmental indicator is a parameter, or a value derived from parameters, that points to, provides information about and/or describes the state of the environment, and has a significance extending beyond that directly associated with any given parametric value. The term may encompass indicators of environmental pressures, conditions and responses.

■ **Ecosystem connectivity** – The interconnection of different habitats to allow species movement. This includes creating and managing habitat corridors and buffers, as well as preventing further fragmentation of habitats by development and other land-uses.

■ **Biodiversity off sets** – actions taken to address a loss of biodiversity as a result of a project or intervention. For example gazetting a protected area of forest to offset the loss of equivalent forest that has been inundated by a hydropower reservoir.

■ **Policy and regulations for environmental protection** – examples include threatened species and protected area legislation, EIA legislation, threshold limits set and enforced

■ **Ecosystem integrity** - is defined as the long term ability of an ecosystem to self-support and maintain an adaptive community of organisms having a species composition, diversity, and functional organization favourably comparable to that of nearby natural habitats.

■ **Critical habitat** - includes areas with high biodiversity value, including habitat required for the survival of critically endangered or endangered species; areas having special significance for endemic or restricted-range species; sites that are critical for the survival of migratory species; areas supporting globally significant concentrations or numbers of individuals of congregatory species; areas with unique assemblages of species or which are associated with key evolutionary processes or provide key ecosystem services.

TOPIC 7
Flows and reservoir management

This topic addresses management of the hydrological resource, reservoir management, downstream flows and flood and drought management.

The intent is that hydropower planning and management for inflows, reservoirs and downstream and environmental flows exists within an agreed water use framework to achieve multiple social, environmental and economic objectives.

7.1 Multiple water use optimisation and efficiency

A. River basin planning –
Baseline data exists on water availability, demand and consumptive and non-consumptive water use, including navigation and fisheries. A hydrological model has been developed for the basin and addresses different water use scenarios. The effect of climate change on future water availability and flows is assessed.

B. Energy / power sector planning and regulation –
Multiple use projects are prioritised in government options assessment, optimisation and ranking studies.

C. Hydropower projects –
Hydropower feasibility studies are consultative and seek to enhance design and operational opportunities for multiple-use where feasible. Hydropower projects co-ordinate with other agencies and water users in the operations stage to achieve agreed multiple-use objectives.

D. Regulatory and governance –
A water use framework exists in domestic legislation and international agreements that sets limits, rules and procedures for consumptive and non-consumptive water use in the basin. Monitoring of water use is conducted. Regulatory mechanisms exist for the resolution of water allocation conflicts.

7.2 Reservoir planning and management

A. River basin planning –
Government water and energy agencies conduct integrated planning to set operational limits for hydropower operations such as, full supply levels, drawdown limits and water release requirements, to integrate with power generation requirements. Reservoir planning, impoundment and operations are conducted within agreed water management limits and thresholds for the basin.

B. Energy / power sector planning and regulation -
Projects selected for development aim to minimise the area flooded per unit of energy. Schemes make best use of storage characteristics and operations to meet current and future electrical load patterns and other water demands in the basin.

C. Hydropower projects –
Reservoirs are designed to avoid, mitigate and off-set impacts including loss of forest resources, population displacement and greenhouse gas emissions. Reservoir filling plans addresses biomass removal, the timing of environmental and social plans and downstream impacts. Reservoir filling and operational procedures are in place to address reservoir management issues.

D. Regulatory and governance –
Project agreements and regulations provide clear institutional arrangements for reservoir ownership, access and management responsibility. Roles and responsibilities are allocated and there is a co-ordinated approach to managing compliance with reservoir management, operating rules, storage and release commitments.

7.3 Co-ordinated hydropower operations

A. River basin planning –
There is allocation of responsibility and institutional arrangements in place for co-ordinated water management and power generation in the basin amongst multiple projects. Hydropower operations co-ordinate with other water users in the basin.

B. Energy / power sector planning and regulation –
Co-ordination of the power system, including hydropower cascades, makes optimal use of hydropower capability (peaking, load following) and achieves balanced and equitable water use at the sub-basin level. Project level agreements include provision for co-ordination of operations amongst projects in a cascade or sub-basin and consistent design and operational mitigation measures.

C. Hydropower projects –
Projects co-ordinate their operations to achieve basin objectives, efficient water use and optimise electricity generation. Design and operational environmental mitigation measures are consistent and co-ordinated between projects to optimise outcomes.

D. Regulatory and governance –
A regulatory framework for hydropower includes provision for multiple projects in a cascade to co-ordinate at all project stages for optimal electricity generation, and efficient resource use. Transboundary mechanisms exist for co-ordination and co-operation for hydropower operations on international rivers

7.4 Downstream and environmental flows

A. River basin planning –
Environmental flows assessment has been conducted for all river reaches affected or potentially affected by hydropower operations to establish criteria and thresholds for environmental and downstream flows. It includes assessment of wetlands and floodplains. It is consultative and informed by scientific baseline data.

B. Energy / power sector planning and regulation -
Water management constraints on electricity dispatch are embedded in electricity dispatch and off-taker agreements. Compliance is monitored and publicly disclosed. Project agreements include design and operational performance criteria to deliver agreed environmental and downstream flows.

C. Hydropower projects –
Projects conduct environmental and downstream flow assessments in feasibility stage to inform project design and operations. Project design and operation rules address commitments made for environmental flows and downstream water releases. Hydropower projects comply with environmental and downstream flow commitments.

D. Regulatory and governance –
International agreements, national laws and basin plans relating to water allocation include provision for environmental flows. ESIA regulations and guidelines include provision for environmental flow assessment. Where commitments are made for environmental and downstream flows, their effectiveness is monitored at agreed sites.

7.5 Flood and drought management

A. River basin planning -
A basin flood and drought management plan includes flood monitoring and forecasting systems and planning for flood and drought response.

B. Energy / power sector planning and regulation –
Project agreements and electricity dispatch arrangements include provision for design and operational flood and drought response measures. Agreements include provision for flood management to be prioritised over power generation in emergency situations.

C. Hydropower projects –
Operating rules, project design, management plans include flood and drought mitigation measures that comply with statutory plans and are implemented. Response to flood and drought is co-ordinated amongst projects in a cascade.

D. Regulatory and governance –
National and provincial governments have flood and drought plans and policies in place, including allocation of roles and responsibilities. Plans are implemented and enforced and the response to drought and flood events is managed in a co-ordinated manner in the basin.

TOPIC 7

Guidance Notes and Definitions

■ **Examples of evidence:** ESIA reports, project design and feasibility studies, operating rules and project agreements, flood and drought management plans, water allocation plans and policies, IWRM plans, multiple use studies, options assessment

■ **Multiple use** – refers to a hydropower project that is designed and operated for other uses in addition to hydropower and may include; irrigation storage, navigation; flood control; flow regulation; reservoir fisheries, recreation.

■ **Design and operational flood and drought response measures** – examples include maintenance of reservoir flood storage capacity, mechanisms to alter hydropower generation to respond to flood control needs.

■ **Environmental Flows** – the quality, quantity, timing and duration of water flows required to maintain the components, functions, processes and ecosystem resilience of aquatic ecosystems which provide goods and services to people and nature.

■ **Reservoir management issues** – examples include water quality issues including eutrophication, bank slumping and erosion, recreational and commercial reservoir uses, public safety, flood management, navigation, thermal stratification, public access, greenhouse gas emissions and debris management.

■ **Project design for downstream flows include:** variable outlet and turbine generator capacities; multi-level, selective withdrawal outlet structures; sediment sluice gates, fish passage structures, environmentally friendly sediment flushing procedures, co-ordinated operations of cascades of dams; re-regulation of reservoirs; operational rules for sediment passage or environmental flow release; re-operations of existing dams; flood management procedures in floodplains; and flexibility to modify dam operations in the future.

■ **Examples of consumptive water uses** – irrigation, urban water supply, rural water supply, industrial uses, livestock.

■ **Examples of non-consumptive water uses** – fishing and aquaculture, tourism and recreation, flood control, ecosystem maintenance, cultural and spiritual, navigation.

■ **Timing of environmental and social plans** – means that sufficient time is allowed to implement environmental and social plans before reservoir filling commences. Examples include the resettlement actions plan and arrangements for populations to be relocated to suitable accommodation before reservoir filling commences and sufficient time for vegetation and wildlife removal

■ **Water management constraints on electricity dispatch** – examples include environmental or downstream minimum flow release, reservoir level agreements, ramp down rates, commitments to maintain flood storage capacity

■ **Biomass removal** – the removal of vegetation from a reservoir to address water quality risks and reduce reservoir emissions as a result of vegetation inundation and decay.

■ **River reaches affected by hydropower operations** – are assessed on a project basis and may extend several hundred kilometres downstream for large projects depending on the scheme size, project design and operation, the characteristics of the river system, the extent of seasonal storage and flow regulation, use of diversions etc.

■ **Inter-reservoir operating rules** – rules established for coordinated operations and water management between reservoirs in a cascade

■ **Ramp down rates** –the rate at which the water level falls in the reservoir as the result of hydropower operations. Slower ramp down rates can reduce impacts to the reservoir and downstream environment that may occur as the result of a rapid drop in water level.

■ **Electricity dispatch systems** – the system in place for dispatch of electricity from the hydropower station, which may be a centrally controlled integrated dispatch centre for multiple projects or a single off taker arrangement.

■ **Reservoir storage characteristics** – includes; flooded area, bathymetry, full supply level, minimum operating level, debris control structures

TOPIC 8

Erosion, sediment transport and geomorphological impacts

This topic addresses the management of erosion, sediment transport and geomorphological impacts associated with hydropower development in the basin.

The intent is that erosion and sediment dynamics are understood at the basin level and hydropower impacts are identified and managed effectively to minimise downstream social, economic and environmental impacts and maximise reservoir life span, asset reliability and efficiency.

8.1 Sediment baseline and impact assessment

A. River basin planning -
A basin-wide baseline and ongoing monitoring of sediment sources and characteristics, land use, sand extraction, river morphology and hydrology exists. It includes studies of sediment production zones and the processes that control erosion, sediment transport and deposition. The role of sediments in natural resource productivity and river bank stability is assessed.

B. Energy / power sector planning and regulation -
Hydropower options assessment and power planning studies include criteria to rank technical, financial and economic risks associated with project sites located downstream of major sediment production zones.

C. Hydropower projects –
ESIA studies include the development of a sediment budget, potential for and magnitude of sediment trapping and impacts to downstream sedimentation processes and river bed and floodplain forms. The impact on reservoir life span as a result of sediment trapping is included in project level assessments.

D. Regulatory and governance –
ESIA guidelines and MOU's include requirements to assess erosion, sediment transport and geomorphological impacts. Standards or guidelines exist and are enforced for design and operational requirements for hydropower sediment management and flushing. Regulatory authorities commission cumulative impact assessments in basins with multiple projects.

8.2 Management of impacts and sediment resources

A. River basin planning –
Management plans exist and are implemented to address erosion impacts from land and water use activities and the in stream extraction of in river sand, gravel and cobbles. Regulations are enforced to ensure the sustainable extraction of in river sediment and mineral resources.

B. Energy / power sector planning and regulation -
Guidelines and standards exist for the avoidance and mitigation of sediment trapping risks in hydropower reservoirs. They are enforced and applied to all new projects in the basin to manage technical and financial risks. Project agreements include design and operating requirements for sediment flushing where high potential for sediment trapping is identified.

C. Hydropower projects –
Hydropower projects in the basin are sited, designed and operated to avoid and minimise trapping of sediment in reservoirs and downstream geomorphological impacts. Where sediment flushing will be required, reservoir bathymetry studies and a sediment flushing feasibility study and EIA is conducted to inform sediment flushing design and operating rules.

D. Regulatory and governance –
Regulatory authorities monitor compliance against regulations and management plans and the effectiveness of management measures.

TOPIC 8
Guidance Notes and Definitions

- **Examples of evidence** – sediment baseline and monitoring reports; projects EIA's; feasibility studies; guidelines for sediment management; land use planning documents; IWRM plans; basin sediment budget; geomorphological mapping or river characterisation studies.

- **Sediment production zones** – areas of a basin that contribute sediment to the river system as a result of erosion.

- **Processes that control erosion, sediment transport and deposition** – examples include flow velocity, bed slope, floodplain form, channel characteristics, land use, geology and run-off

- **Sediment flushing feasibility and EIA** – is required to assess whether sediment flushing is feasible for a hydropower project. In some cases, sediment flushing is not possible due to project or river basin characteristics. The feasibility of sediment flushing will depend on reservoir bathymetry, sediment characteristics, flow, generation constraints, dam wall design and sediment passage structures. An EIA study is required to determine the environmental impact of sediment flushing on the downstream environment to inform design of environmentally friendly sediment flushing.

TOPIC 9
Management of fisheries resources

This topic addresses basin-wide fisheries management to address hydropower impacts and the management of upstream, reservoir and downstream fisheries resources in a basin.

The intent is that hydropower and water resources are developed in a way that allows for the protection and further development of fisheries resources in a basin and that fishery dependent communities are not worse off as a result of hydropower.

9.1 Fisheries baseline and impact assessment

A. River basin planning -
A basin-wide baseline and regular monitoring of fisheries resources including catch and consumption, biodiversity, habitat range and migratory behaviour of fish and other aquatic species exists. Data is disaggregated by fishery types, including in river, floodplain, reservoir, rice paddy and aquaculture fisheries.

B. Energy / power sector planning and regulation –
Energy options assessment and hydropower optimisation and ranking studies includes analysis of socio-economic trade-offs between hydropower and the fishery sector at national and local levels.

C. Hydropower projects –
EIA studies use appropriate fishery expertise, consult with fishers and assess the impacts of habitat modification, fragmentation and flow regulation on fishery productivity and biodiversity. A pre-project baseline is established against which future change is monitored.

D. Regulatory and governance –
Regulations and project agreements for hydropower specifically address fisheries social and environmental impacts. Threatened species legislation exists including provision to protect critical aquatic habitat areas and food chain species and is enforced at local levels.

9.2 Management of impacts and fisheries resources

A. River basin planning –
A basin wide fisheries management framework exists and includes measures to promote fisheries productivity and regulate fishing activity. The effectiveness of management measures is monitored. Where reservoir fisheries are established a framework exists for their management, monitoring and sustainable harvest.

C. Hydropower projects –
Where feasible, siting and design measures and operational procedures are implemented to avoid and minimise fishery impacts. The effectiveness of mitigation measures is measured against baseline data and publicly disclosed. Compensatory and off-set measures are deployed in the sub-basin to address losses in fishery productivity or biodiversity as a result of hydropower.

D. Regulatory and governance –
Fishery plans regulations, catch limits, restricted fishing zones and other measures are enforced to protect fishery resources. EIA laws and regulations require fisheries impacts to be addressed and requirements for mitigation are included in hydropower project agreements. The effectiveness of fishery management and mitigation approaches and hydropower compliance with regulations is monitored by regulatory authorities.

TOPIC 9
Guidance Notes and Definitions

Examples of evidence; national fisheries policies and regulations, Basin fisheries policies and plans, EIA regulations for fish, Ecological and habitat assessments, Project EIA studies, Project feasibility studies, Optimisation studies, Hydropower design reports, Hydropower operational procedures and plans, Photographic evidence of dam structures, Project feasibility and optimisation studies, Fish conservation management plans, Environmental (and construction) management plans.

Design and operational provisions for fish management – includes fish passage structures; co-ordinated operations of cascades of dams; re-regulation of reservoirs; and flexibility to modify dam operations in the future; reservoir fisheries and environmental releases to support habitat requirements.

Habitat modification – refers to changes in fish habitat, examples include conversion of a stretch of river from a river channel to a reservoir, changes in deep pools and rapids; changes in food chain species, changes in flow and availability of nutrients.

Habitat fragmentation – in the context of hydropower refers to the barrier effect of dams on migratory species and sediment transport, or terrestrial habitat fragmentation caused by roads or transmission lines.

TOPIC 10
Dam and community safety

This topic addresses basin-wide dam and community safety at all hydropower project stages.

The intent is that life, property and the environment are protected from the consequences of dam failure, dam operations and other hydropower related safety risks across the basin.

10.1 Dam safety

A. River basin planning –
Dam owners, government agencies and water users co-operate with each other to address basin-wide and cascade dam and community safety issues.

B. Energy / power sector planning and regulation –
Energy planning and regulatory agencies mandate clear regulations and standards for dam safety at all project stages in laws, regulations and project agreements.

C. Hydropower projects –
All hydropower projects in design, construction and operation stages have a systematic approach to dam safety risks and asset management that complies with mandated national and regional standards and includes review of independent expert panels. Dam owners report regularly on dam safety issues.

D. Regulatory and governance –
Regulatory authorities enforce dam safety regulations consistently across the basin at all project stages including design and construction. There is ongoing monitoring and surveillance at all project stages and independent review panels review technical data. Action is taken to address non-compliances and issues that arise.

10.2 Community safety and emergency response

A. River basin planning –
Integrated planning for emergency response, including sudden water release, flood, and other disasters exists amongst stakeholders in the river basin. Notification, warning and evacuation systems exist, are tested and are used in a timely manner. Flood risk analysis exists for the basin and includes hydropower assets and operational requirements.

B. Energy / power sector planning and regulation –
Policies and standards exist for public safety issues associated with hydropower.

C. Hydropower projects –
Hydropower procedures for water releases include provision for notification and warning systems, emergency response plans and the avoidance, mitigation and compensation for harm to life and property. There have been no major hydropower related community safety incidents in the basin.

D. Regulatory and governance –
Regulations for emergency response plans and community safety plans for hydropower projects exist and are enforced. Government plans for emergency response including flood and disaster response exist and are tested. Laws and regulations include provision for compensation for damage to life and property and are enforced. Emergency response plans are regularly tested with provincial and local police and emergency crews.

TOPIC 10

Guidance Notes and Definitions

Examples of evidence - Dam Safety Management System documentation; dam safety risk assessment reports independent auditing and monitoring reports; integrated dam safety risk assessment reports; emergency Preparation Plan (EPP); integrated EPP for the basin, training programs, community awareness programs dam break analysis reports for projects in a cascade; national and regional emergency flood management plans and policies.

Safety considerations at different stages of development

Design stage - In the asset design, adherence with safety standards and the expertise used in the design team to address various safety issues is an important consideration. Specialists should include: engineering geologists, seismic experts, civil engineers, dam safety specialists, mechanical and electrical engineers and the use of independent expert review. The design stage should include identification of all potential failure points in the dam, power station and associated infrastructure and identify design and operational strategies to manage risks. There should be consideration of risks associated with other projects in a cascade and other events in the basin such as flood events.

Construction stage - During the construction stage, infrastructure safety issues include quality control processes to ensure infrastructure is constructed to design standards, flooding risks associated with temporary diversion and storage structures; construction related safety issues and the establishment of a monitoring baseline

Operation stage - During the operation stage the focus will be on the systematic and routine monitoring and surveillance of infrastructure to ensure it achieves safety objectives, as well as the emergency response processes that are in place. An important consideration is a systematic approach to risk management and response to issues that are identified. Public safety measures around infrastructure such as barriers and signage are also an important consideration

Dam (Infrastructure) Safety Management System - Hydropower developers and operators should have a systematic approach to infrastructure safety issues that meets required standards and includes associated infrastructure (e.g. power stations, transmission lines, roads, reservoirs). This is usually called a Dam (Infrastructure) Safety Management System and should be in place for all stages of development and include: (i) an emergency preparedness plan, (ii) construction supervision, instrument and quality assurance plans during construction, (iii) an operation and maintenance plan and safety monitoring and risk management system (iv) independent expert review, (v) dam break analysis for cascades and (vi) consideration of downstream safety risks such as drowning risks and property damage.

Emergency Plan - An Emergency Plan should include; public safety signage, exclusion zones, dam release notification and warning systems, community awareness, emergency preparedness, flood management, monitoring, inspections, training, incident response, communication, and allocation of responsibilities.

Definitions

Bilateral agreements – agreements and relations between two parties; two sovereign states.

Biodiversity – the variation of life forms within a given ecosystem, biome, or on the entire Earth. Biodiversity is often used as a measure of the health of biological systems.

Biodiversity hotspot – a site with a significant reservoir of biodiversity that is biologically richest and under threat from humans.

Carbon finance – the revenue generated under a United Nations Framework Convention on Climate Change (UNFCCC) arrangement which allows industrialised countries with an emissions reduction commitment to invest in ventures that reduce emissions (e.g. planting trees) in developing countries.

Compliance – addresses the level of conformity with legal requirements and other public commitments that have been made for particular aspect.

Cumulative impacts – the phenomenon of changes that result from numerous human-induced alterations, in this case the impact of multiple dams and other human interventions in a basin as opposed to one dam.

Directly affected stakeholder – those stakeholders with substantial rights, risks and responsibilities in relation to the issue. These may be outside the project-affected area, such as government regulators, finance institution representatives, or investment partners.

River basin – an extent of land where water drains downhill into a body of water, such as a river, lake, reservoir, estuary, wetland, sea or ocean. The drainage basin includes both the streams and rivers that convey the water as well as the land surfaces from which water drains into those channels, and is separated from adjacent basins.

Ecosystem – the combined physical and biological components of an environment. An ecosystem is generally an area within the natural environment in which physical (abiotic) factors of the environment, such as rocks and soil, function together along with interdependent (biotic) organisms, such as plants and animals, within the same habitat. Ecosystems can be permanent or temporary.

Ecosystem functions – the physical, chemical, and biological processes or attributes that contribute to the self-maintenance of an ecosystem; what the ecosystem does.

Ecosystem integrity – including key habitats, species range and migratory needs, ecosystem connectivity, nutrient flow and food web.

Ecosystem health monitoring – describes the processes and activities that need to take place to characterise and monitor the quality and health of the environment/ ecosystem.

Ecosystem values – the environmental, economic, social values of an ecosystem.

Environmental quality – the status and health of the environment.

Environmentally friendly sediment flushing – the passing of sediment trapped upstream of a dam to the downstream environment in a way that does not have a negative impact on the downstream ecosystem or community.

Environmental Flows – the quality, quantity, timing and duration of water flows required to maintain the components, functions, processes and ecosystem resilience of aquatic ecosystems which provide goods and services to people (TNC 2006).

Environmental health data – any information or data on the health of the environment.

Evidence – evidence provided and used by an assessor to verify whether and to what degree an attribute has been met. Evidence can be qualitative or quantitative information, records or statements of fact, either verbal or documented. It is retrievable or reproducible; not influenced by emotion or prejudice; based on facts obtained through observations, measurements, documentation, tests or other means; factual; objective and verifiable.

Feasibility studies – consider current and future potential use of natural resources and the opportunity cost of hydropower to natural resources use.

Habitat – an ecological or environmental area that is inhabited by a particular species of animal, plant or other type of organism.

High value – something that is of high or significant environmental value.

Integrated – merged, interspersed and embedded into something.

IWRM – integrated water resource management planning.

International agreement/treaty – an agreement under international law entered into by actors in international law, namely sovereign states and international organizations.

Jurisdiction – is the practical authority granted to a formally constituted legal body or to a political leader to deal with and make pronouncements on legal matters and, by implication, to administer justice within a defined area of responsibility.

Line agencies – agencies at national or sub-national level which carry out policies and provide services.

Livelihood – refers to the capabilities, assets (stores, resources, claims and access) and activities required for a means of living.

Management system – the framework of processes and procedures used to ensure that an organisation can fulfil all tasks required to achieve its objectives.

Mitigation strategies – a strategy that is designed to reduce or eliminate risks to people and property from natural and man-made hazards. Mitigation strategies are supported by state government and federal programs.

Multilateral agreements – agreements and relations between a number of parties; between a number of states.

Multiple-use optimisation studies – studies and methodologies to provide harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of something else, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output.

Multiple-use benefits – the broad range of uses for hydropower reservoirs e.g. irrigation, water supply, recreation, navigation.

National agreement – an agreement under national law.

National water policies – water policies that apply to the entire nation.

Natural resources – are derived from the environment (e.g. soil, water, air, biota).

Optimal – best fit, once all considerations have been factored in, based on the outcomes of a consultative process.

Optimisation studies – any study to find the best fit or balance between competing needs.

Poverty – refers to the condition of not having the means to afford basic human needs such as clean water, nutrition, health care, education, clothing and shelter.

Project-affected area – the catchment, reservoir, and downstream of the project site and associated dams; the area affected by any associated infrastructure developments (e.g. roads, transmission lines, quarries, construction villages, etc); and any area to which project affected people might be relocated.

Project-affected communities – the interacting population of various kinds of individuals living the region that is directly affected by the hydropower project preparation, implementation and/or operation, as well as those who may live outside of the project affected area but are economically displaced by the project.

Rare and endangered species – any species that is listed under State, Territory, Commonwealth, or international legislation or treaties as being 'rare' or 'endangered' in its current form or distribution.

Regional agreement – an agreement under legislation for a particular region.

Regional ecosystem connectivity – the connectivity of an ecosystem at a regional/local scale. Any interactions among individuals or species in an ecosystem can be considered to be connections.

Reservoir storage – artificial lake used to store water.

River navigation locks – is a device for raising and lowering boats between stretches of water of different levels on canal waterways. Locks are used to make a canal more easily navigable, or to allow a canal to take a reasonably direct line across country that is not level.

Sediment flushing/passage – the passing of sediment trapped upstream of a dam to the downstream environment.

Sediment budgeting – an assessment of the quantity, quality, flow, erosion and deposition of sediment in a defined basin area.

Stakeholder – one who is interested in, involved in or affected by the hydropower project and associated activities.

Stakeholder group – a group of stakeholders with common characteristics or interests.

Sub-basin – a sub-unit in a drainage/river basin defined by a drainage divide.

Sustainable development – development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Sustainability – the capacity to endure; to remain diverse and productive and provide essential needs in the future.

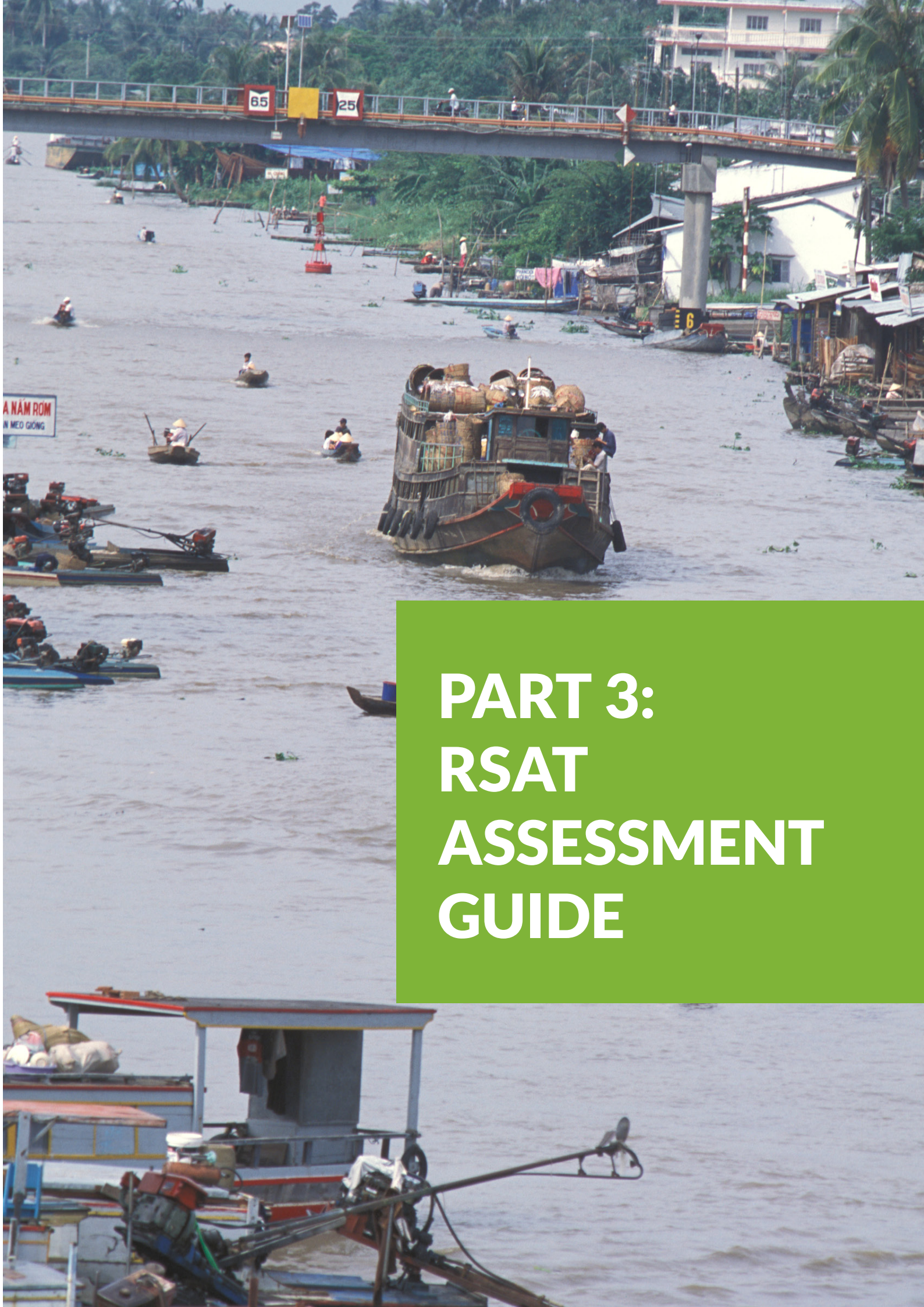
Sustainability criteria – a set of considerations that if adhered to will result in sustainable development.

Transboundary – crossing or existing across national boundaries

UNFCCC – United Nations Framework Convention on Climate Change.

Vulnerable social groups – social groups who are marginalised or impoverished with very low capacity and means to absorb change.

Watershed – a drainage divide or basin.



PART 3: RSAT ASSESSMENT GUIDE

Assessment Guide Introduction

This RSAT Assessment Guide contains basic advice, information and preliminary resources required to establish, prepare for and conduct an RSAT assessment. Additional resources, detailed assessment preparation checklists and templates, training materials, community user's guide and information on the RSAT will be posted on the MRC website as they become available.

Visit - http://www.mrcmekong.org/

There are five stages of an RSAT assessment as listed below. This Assessment Guide provides information and guidance on each stage of the assessment.

- **Establishment stage**
- **Preparation stage**
- **Assessment stage**
- **Reporting stage**
- **Follow up stage**

RSAT Establishment Stage

For an RSAT assessment to be established the need and clear objectives for the assessment must be defined. In addition, various stakeholder groups need to be involved either directly to participate in the assessment or indirectly to provide access to data and information and support the overall process. The establishment stage is mainly concerned with communication about the RSAT process and engagement with key stakeholder groups for the target sub-basin to gain support for the assessment. Funding and resourcing also needs to be confirmed and a lead institution nominated to co-ordinate the process.

The checklist on the following page can be used during the establishment stage to clarify the rationale for the assessment and to identify key stakeholders groups to be involved in the assessment and data sources.

TABLE 1: RSAT ESTABLISHMENT CHECKLIST

Establishment stage checklist	
Why conduct an RSAT assessment in the basin?	
What is the desired outcome of an RSAT assessment in the basin?	
Make a list of possible objectives for the assessment.	
Conduct a stakeholder analysis to determine the key stakeholder groups in the basin for IWRM and hydropower development	
Who are the key stakeholders to include in the assessment and why?	
What hydropower development (planned, committed and operational) is there in the basin? Is information on the hydropower projects available and how can hydropower developers be involved in the process?	
What are some of the key hydropower sustainability issues in the basin?	
Is the basin shared between two or more countries?	
Does the basin have an RBO or RBC or is there a plan to form one?	
How many provinces and districts share the basin?	
Are there local water user groups or equivalent active in the basin?	
Which are the key agencies (national and provincial) with responsibility for energy and water planning in the basin?	
Which are the key agencies (national and provincial) with responsibility for environmental, social and economic planning in the basin?	
What are the important sectors in the basin (e.g. fishing, agriculture)?	
What other studies have been completed that relate to IWRM and hydropower development?	
Is funding available for the assessment?	
Which institution or group will co-ordinate the assessment process?	
Are their universities, research centres, NGO's or donors working in the basin?	
What are the risks for conducting the assessment?	
What are the key data sources and how can data be accessed?	
How well established are the working relationships amongst the stakeholder groups to be involved in the assessment?	

A lead institution or group with the resources and capacity to co-ordinate the RSAT assessment process will need to:

- Provide funding and logistical support;
- Access stakeholders and data and information for the assessment;
- Appoint resources to conduct assessment preparation and facilitation tasks;
- Bring participants to participate and provide data and other inputs; and
- Plan for a follow up process for actions and issues identified during the assessment.

RSAT Preparation Stage

The preparation stage is a critical stage in the RSAT assessment process and is the most time consuming stage. The preparation stage involves preliminary research on the basin and hydropower development to establish the key issues, stakeholders, objectives and methods for the assessment. Once objectives are established, detailed data will be collected for each topic. Data can be collected by data collectors over a period of two to four weeks or longer depending on the availability of data and the complexity of the basin and development context. The tasks in the preparation stage may be conducted by an individual or assessment preparation team members who share responsibility for different tasks.

Preparation of the assessment consists of the following tasks:

- Definition of the scope of the assessment and identification of priority issues for the basin
- Appointment of human resources to prepare for the assessment;
- Decisions on how the assessment will be conducted and methodologies to be used;
- Definition of the expected outcomes, reporting requirements and responsibility for follow up actions;
- Selection of assessment participants and appointment of a facilitator;
- Identification of key data sources for each topic and key stakeholder groups with data and information to contribute to the assessment
- Collection of information and data;
- Preparing the presentation of data and information for each topic, including preliminary gap analysis using assessment templates;
- Organise a field visit to the sub-basin as part of the assessment;
- Liaison with hosts/relevant organisations to gain permissions, access and support; and
- Logistical preparation – venue, dates, field visit, invitations, communications etc.

Once the above tasks are completed, the assessment can be conducted. The successful implementation of the assessment will depend on the availability of all relevant information and data and people to interview during the assessment period. An assessment preparation team can complete the assessment preparation stage tasks over a period of two to four weeks depending on the availability of data and information.

Preliminary planning for the assessment

Below is a checklist that can be used to provide guidance to the assessment preparation team or individual in preparing for the assessment.

TABLE 2: ASSESSMENT PLANNING AND PREPARATION CHECKLIST TO IDENTIFY OBJECTIVES

About the assessment	
Statement of the scope of the assessment – which basin and program of hydropower development is being assessed?	
What are the expected outcomes of the assessment?	
What will the results of the assessment be used for?	
Who will form the assessment panel and who will facilitate the assessment?	
What is the main priority for the lead institution for the assessment?	
How can different levels of governance from local to national be represented?	
What other studies, projects or initiatives exist in the basin that are relevant to the assessment? Can the assessment be linked to these other initiatives?	
About the basin	
Gather a list of hydropower projects, developers and operators (existing, proposed, under construction) for the basin.	
Is there a river basin plan or IWRM plan for the basin being assessed ? How can the RSAT assessment support the objectives of the plan?	
What are the priority issues for the basin, based on preliminary desktop research?	
How will information on all relevant national and transboundary agreements, policies, legislation, standards and regulations for the basin be gathered? Is this information available?	
Is the basin a transboundary basin? How are the different countries being represented in the assessment and is information and data available for all countries sharing the basin?	
Are data and information such as baseline studies of biodiversity, hydrology, cultural heritage sites and socio-economic data available for the basin? Where is the data located and will the assessment preparation team have access to it?	
Is information available from hydropower developers and operators or national government agencies on hydropower project design, siting, feasibility and options studies?	
Which people or institutions with knowledge of the basin, policies and regulations and hydropower development can provide information for the assessment and/or be interviewed for the assessment?	
Assessment outcomes and outputs	
Who will be responsible for reporting on the assessment results and who will they be reported to?	
Where will the information from the assessment be stored and who will need access to the information?	
Who will be responsible for the assessment and the follow up actions from the assessment?	

Completing the above checklist will assist to identify the key issues and data sources in the basin and to understand the stakeholder environment. A range of resources, templates and detailed training and guidance is available to assist the assessment preparation team to prepare for the assessment.

Identifying priority issues for the basin

It is recommended that the assessment preparation team conduct preliminary desk top research on the sub-basin to identify the priority issues for the basin. The assessment preparation team can conduct preliminary web research or consult with local stakeholders or basin experts depending on what information is available. Understanding the priority issues will assist to form clear objectives for the assessment. For example, it may be that a key issue in a particular basin is the issue of hydropower and flood management practices in the basin. In this case, the data collection effort on these issues can be increased to ensure there is adequate information and representation on these issues for the assessment or assessment objectives may be set to focus more attention on the key issues.

Selecting assessment objectives and methodologies

The objectives for the assessment need to be agreed upon by the assessment participants and lead institution prior to the commencement of the assessment. It is recommended that a preliminary briefing be provided to the RSAT assessment participants prior to the commencement of the assessment to ensure that participants understand the process and agree on assessment objectives. If a pre-assessment briefing is not possible, then the setting of assessment objectives should be discussed in the opening of the assessment workshop so that participants can agree on objectives prior to commencement of the assessment. After filling in the above checklists, the assessment preparation team will have developed some potential objectives for the assessment.

Examples of assessment objectives are given below:

Examples of RSAT assessment objectives:

- To identify gaps in data, regulatory frameworks, institutions and on-ground practices
- To identify the development risks, opportunities and priority issues in the basin within a structured framework
- To inform the scope of cumulative and strategic impact assessment studies
- To inform studies to optimise development outcomes in a sub-basin
- To assist river basin organisations to engage in the hydropower planning and management process and develop action plans based on identified priorities
- To assist water and energy planners to identify needs and opportunities for collaboration and co-ordination
- To inform the development of a watershed management strategy in a hydropower sub-basin
- To monitor hydropower sustainability performance in a sub-basin
- To establish dialogue and collaboration between different hydropower and river basin stakeholders
- To conduct capacity building or training in hydropower sustainability or IWRM
- To assess transboundary arrangements for hydropower development

Stakeholder analysis and selection of assessment participants

The RSAT is designed to facilitate structured dialogue between key stakeholder groups for basin wide hydropower sustainability. During the assessment establishment and preparation stage, a stakeholder analysis should be conducted to identify key stakeholder groups

for IWRM and hydropower development in the basin and their pre-assessment level of interaction with each other. The objectives for the assessment should be developed in consultation with key stakeholder groups for the basin. The key stakeholder groups in the basin may have well established communication channels and working relationships or they may have little interaction with each other. There may also be tension or conflict between some key stakeholder groups in the basin. Building collaborative relationships amongst key stakeholder groups is a long term process for IWRM and a staged approach may be needed to bring different groups together for multi-stakeholder RSAT assessments.

Assessment participants should be selected to support assessment objectives and should represent different areas of responsibility and interests at different levels from local to national. Stakeholder groups can work together in a multi-stakeholder assessment approach or they may work separately initially in order to build trust and understanding of the process before they come together in a multi-stakeholder context. Some groups may need training or support to understand the technical aspects of the RSAT before they can engage in an RSAT assessment process, in which case a capacity building or training program can be included in the assessment approach. The selection of assessment approaches and participants needs to be flexible and will be driven by the development context for the basin and the existing stakeholder environment and level of capacity.

In sub-basins where multi-stakeholder assessments are planned, participants should include representation of different groups and interests in the basin. It is essential that participants have local knowledge and experience working in the basin. For example, a representative from a hydropower company should be a senior technical staff member that is working in the sub-basin and understands the details of the projects and operating environment. Government representatives should include staff that have worked in the basin or been directly involved in the various studies related to IWRM and hydropower development in the basin. The optimum number of assessment participants is considered to be 10-15 people, supported by a facilitator and data collector(s).

As hydropower sustainability requires expertise across a range of disciplines, the assessment will require inputs from a number of people with appropriate expertise and/or local knowledge of the basin and hydropower projects. An RSAT assessment should include either inputs or participation from the following stakeholder groups to ensure a diversity of interests and appropriate expertise contributes to the assessment:

- Representatives from different institutions at different levels with key responsibilities in the basin (e.g. government agencies, river basin organisations, other key sectors in the basin);
- People with local basin knowledge and experience with on ground practices in the basin;
- Social, environmental and economic experts with knowledge, experience and / or responsibility for activities in the basin;
- Engineering and technical expertise in hydropower and dams in the basin and representatives from hydropower projects.
- Representatives of local water user groups and other natural resource management community groups in the basin;
- Historical data; and
- Academic institutions or NGO's conducting work in the basin.

For a multi-stakeholder assessment process to deliver objective outcomes, a balance of representation from different stakeholder groups and interests, supported by good quality and independent facilitation is required.
Selection of assessment methodologies
Once the objective of the assessment is defined and the participants are selected, the assessment preparation team will develop an assessment approach and methodology. As mentioned above, the assessment approach may include a capacity building or training program to improve the level of technical understanding of the RSAT.

Examples of assessment methods are listed below and are described in more detail in the Assessment Stage section of this Guide:

- Multi-criteria gap analysis
- SWOT analysis
- Action planning
- Institutional mapping and gap analysis

Selection of a facilitator

For multi-stakeholder RSAT assessments it is recommended that a facilitator be appointed to facilitate the group assessment process. The facilitator plays a critical role in an RSAT assessment and should therefore be carefully selected and appropriately qualified. The facilitator may also be involved in data collection for the assessment and may or may not be the person to present the evidence to the assessment participants. The Facilitator should be independent and should not have a particular vested interest in the assessment or the hydropower or water resource development in the river basin. It is helpful however if the facilitator has knowledge of the basin so that s/he can question participants to draw out additional information. The facilitator should be suitably qualified to manage multi-stakeholder group dynamics to ensure that all panel members have the opportunity to participate in the assessment. Additional resources and training are available to assist to build skills and expertise for RSAT facilitators.

Planning a field visit to the basin

A field visit to the basin is an important aspect of an RSAT assessment to ensure participants have an on ground understanding of the basin. If time and resources allow, it is also beneficial for the assessment preparation team to visit the basin to inform planning and the identification of important issues and also to collect local level data and information.

The venue for the RSAT assessment should be located in the river basin and a site visit to the basin is recommended that could include:

- Hydropower projects and related infrastructure;
- Proposed project sites;
- Resettlement communities and a tour of the key basin activities, sectors and land uses;
- Areas downstream of dams and hydropower reservoirs; and
- Other areas of interest that relate to the assessment objectives or the key issues for the basin

Institutional mapping in the preparation stage
The table below can be used to conduct a basic institutional analysis to map regulatory and governance institutions, roles and responsibilities for hydropower sustainability in the basin at different levels. A more comprehensive institutional analysis which focuses on the interactions between various institutions can also be conducted if time and resources allow. Institutional analysis is also one assessment methodologies that can be used during the assessment.

Institutional analysis is an important assessment preparation task as it provides an understanding of the key institutions, policies, plans, roles and responsibilities at different levels and helps to identify gaps.

Table 3 should be completed to list the institutions at different levels with responsibility for different aspects, using the RSAT topics, criteria and performance statements as a guide to identifying institutional responsibilities.

TABLE 3: INSTITUTIONAL MAPPING FOR RSAT ASSESSMENT

Key institutions and stakeholders with responsibilities	
Topic 1 Institutional capacity	
	Institutions, policies, plans, roles, regulations
International	
National	
Provincial	
Local	
Other	
Topic 2: Options assessment, siting and design	
	Institutions, policies, plans, roles, regulations
International	
National	
Provincial	
Local	
Other	
Topic 3: Economic contribution of hydropower	
	Institutions, policies, plans, roles, regulations
International	
National	
Provincial	
Local	
Other	
Topic 4 Equitable sharing of hydropower costs and benefits	
	Institutions, policies, plans, roles, regulations
International	
National	
Provincial	
Local	
Other	

continues on following page...

Topic 5 Social issues and stakeholder consultation	
	Institutions, policies, plans, roles, regulations
International	
National	
Provincial	
Local	
Other	
Topic 6 Environmental management and ecosystem integrity	
	Institutions, policies, plans, roles, regulations
International	
National	
Provincial	
Local	
Other	
Topic 7 Flows and reservoir management	
	Institutions, policies, plans, roles, regulations
International	
National	
Provincial	
Local	
Other	
Topic 8 Erosion, sediment transport and geomorphological impacts	
	Institutions, policies, plans, roles, regulations
International	
National	
Provincial	
Local	
Other	
Topic 9 Management of fisheries resources	
	Institutions, policies, plans, roles, regulations
International	
National	
Provincial	
Local	
Other	
Topic 10 Dam and community safety	
	Institutions, policies, plans, roles, regulations
International	
National	
Provincial	
Local	
Other	

Selecting a river basin scale for the assessment

The assessment preparation team will also decide which scale of river basin to assess. It may be more effective to conduct the assessment in a smaller second order tributary sub-basin for example to enable closer assessment of local level issues associated with hydropower as opposed to a larger basin where a more generalised or higher level assessment can be conducted.

The task of collecting sufficient data for a large basin is a lot more complex than for a small watershed, although data availability for a small watershed may be limited depending on what projects and studies have been conducted. Transboundary river basins will require cooperation and participation of representatives from both countries and data gathering in both countries. The assessment preparation team should select the scale of river basin that matches the objectives of the assessment and the time and resources available for data gathering if large and complex basins are selected.

Advice on data collection

The evidence used for an RSAT assessment is secondary data and information such as reports, studies and regulations. The RSAT assessment process is designed as a rapid process and therefore does not generally include analysis of primary scientific data. Data sets for RSAT assessments can be very complex and cumbersome to collect if the data collection process is not properly managed. The aim is not to collect large amounts of generalised data but to find specific and targeted information to address the performance statements in each criterion. It is important therefore for the data collectors to understand the specific information that is required to match the topics and criteria and the objectives of the assessment to reduce the overall data collection effort and provide more targeted and useful information to the RSAT assessment.

A data gathering guide is available for each topic. If the hydropower projects in the basin is all at one stage of development (e.g. operations stage), then the data gathering effort will focus only on collecting the information from the performance statements that is relevant to that stage of the development. This will simplify the data gathering process. The data collection should also be informed by an understanding of the important issues for the basin and the objectives of the assessment. For example if the objective of the assessment is to assess transboundary issues, then the data collection effort will be focused on information at the national and international level.

It is important to collect specific information. For example if a performance statement refers to the enforcement of regulations, then the data collector must find some evidence that the regulations are enforced. The regulations in this case do not form adequate evidence on their own because the performance statement is specifically asking for evidence that they are enforced. Evidence to demonstrate this may be a compliance report or evidence that government agency staff carry out inspections of projects to check compliance.

Table 4 below provides a list of the categories of data and information that will be used as evidence to conduct an assessment and the potential sources of information.

TABLE 4: SOURCES OF EVIDENCE

Category of information	Source of information
Basin-wide or river data	RBOs or RBCs, national government water resources or other agencies (e.g. fisheries, environmental protection), non-government organisations collecting data and doing studies in the basin, universities or other research organisations, consultants, donors collecting data in the basin.
Hydropower data, information and reports	Hydropower operators and developers, national government agencies responsible for energy and water, consultants assisting with hydropower studies.
National policy, legislation, regulations	National government agencies.
Transboundary information	Regional institutions, national government agencies, RBOs for transboundary basins.

One of the outcomes of the assessment is to identify the gaps in information, data, policies etc. in a river basin. The assessment preparation team should decide how much time to allocate to the information gathering stage based on the resources available and collect as much specific and relevant information as possible within the timeframe. If data or information is not found before the assessment, it may be identified during the assessment from interviewing people or in the follow up stage of the assessment.

How to present evidence for an RSAT assessment

Once the evidence is gathered it is organised into each sub-topic and criteria so that it can be presented to the assessment participants during the assessment. Templates are available to assist the presentation of assessment data. A summary handout of data is prepared for the assessment participants and a summary PowerPoint presentation for each topic is prepared to present the evidence and the results of the preliminary gap analysis conducted during the data gathering stage for each topic. The sources of evidence should be collated into a bibliography (to be included in the report) and the most relevant data made available to the participants where possible to review during the assessment.

Interview schedule for assessment

One source of data is interview of selected experts with knowledge experience and /or responsibility for activities in the basin. The assessment preparation team should identify suitable people for interview and develop an interview schedule. It is important for the assessment preparation team to understand the specific information that is required from interviewees and the Topic Checklists and performance statements should be used for this purpose. The table below can be used as a record of who was interviewed for the assessment and should be attached to the assessment report as an appendix.

INTERVIEW SCHEDULE

Person to be interviewed	Position and organisation	Date of interview scheduled	Person to conduct interview
Basin-wide information, data and reports			
National government policies, regulations, legislations, plans and reports			
Transboundary agreements, policies and mechanisms			
Hydropower data, information, reports, studies, projects			

RSAT Assessment Stage

During the assessment stage, the group assessment process takes place over a period of approximately five days either in a one week block or be split into two sessions depending on logistical considerations. It is also recommended that the RSAT assessment include a field visit to the basin.
This section provides preliminary advice and guidance on the core assessment methodologies that are used to complete an RSAT assessment. More detailed guides and templates are available to assist users.

The basic structure of an RSAT assessment is a group workshop that is led by a dedicated facilitator. All of the assessment activities and methodologies are applied within the five day workshop. The facilitator will plan the activities based on the time available and methods to be used.

Multi-criteria gap analysis

Data is presented on each topic to provide the current status of the basin for that topic and to address the specific RSAT criteria and performance statement requirements in the Topic. The data gatherer or facilitator presents an analysis of where there are gaps against the performance statements and where they are areas of good performance. The assessment group then considers the evidence presented and the basin status to identify which gaps are most significant for the basin and whether they represent priority issues for the basin. The evidence, significant gaps, strengths and priority issues for the topic are recorded. This analysis of evidence and status of the basin for the topic against performance statements provides the basis for the SWOT analysis.

SWOT analysis and identification of priority issues

A core method in the RSAT assessment is the analysis of Strengths, Weaknesses, Opportunities and Threats (SWOT) which is used in all RSAT assessments. SWOT analysis is a qualitative analysis technique that provides a rapid and effective analysis of issues. It draws upon the knowledge and experience of participants and the information made available to them during the assessment.

In the RSAT assessment, a SWOT analysis is conducted for each Topic. The SWOT analysis is best conducted with a facilitator to draw out information from the participants and should be facilitated to encourage dialogue, debate and the sharing of different stakeholder perspectives. The facilitator must ensure that the SWOT analysis is an evidence based approach and not an opinion poll. The SWOT analysis is conducted after the multi-criteria gap analysis is completed and uses the gap analysis as the basis for the SWOT. An example of a SWOT analysis is given below:

Strengths A river basin organization has been established to conduct planning for the river basin.	**Opportunities** Funding will become available for monitoring from a regional program next year.
Weaknesses There is no baseline data for the river basin.	**Threats** There is a lack of access to key monitoring sites due to landowner issues

Action Planning

Once the SWOT analysis is completed, the group will develop a list of recommended actions based on the outcomes of the SWOT and the significant gaps and priority issues identified. The list of actions should include actions required to:

- Address significant gaps and priority issues identified during the multi-criteria and SWOT analysis;
- Take advantage of opportunities identified in the SWOT;
- Build on strengths identified in the SWOT; and
- Address weaknesses and threats identified the SWOT.

It is important to identify responsibility for actions. The facilitator should refer to the mapping of responsibilities for the river basin so that a responsible institution or person can be identified for each action.

In developing actions, the group should also assess how achievable the actions are. For example – "changing national laws and policies" is a difficult action for provincial stakeholders to achieve. Ideally actions identified should be as specific to the issue and the river basin as possible, achievable and at a level that is relevant to the participants conducting the assessment and the institutions responsible for implementing the action. Some examples are given below and can be used to assist the group to develop specific and achievable recommendations.

Examples of non-specific and difficult to achieve recommended actions:

- Collect monitoring data for the basin
- Improve the biodiversity in the basin

Examples of specific and achievable recommended actions:

- Identify funding opportunities for water monitoring programs by end of year
- Install a hydrological monitoring station on tributary X and Y in the next 12 months
- Collect all existing data, reports and monitoring on biodiversity in the basin from universities and government agencies and develop a summary of biodiversity issues and information gaps for the basin.

Institutional mapping and gap analysis

A description of the institutional mapping process is provided in the previous Preparation Stage section and includes a basic template. This process can be conducted by the assessment preparation team during the preparation stage and /or it can be used as a group assessment method during the assessment workshop. The assessment preparation team will decide if there are advantages to conduct a group institutional mapping and gap analysis during the assessment. This will depend on the objectives of the assessment. For example if the objective of the assessment is to clarify roles and responsibilities then a group method would be valuable. Completing an institutional mapping exercise in the preparation stage will assist the facilitator to gain an understanding of the institutional setting for the basin.

Consideration of different levels of governance in RSAT assessments

Different levels of governance include international for river basins shared between countries (e.g. the Mekong River Commission), National (e.g. national laws and policies), Provincial and the various local formal; and informal institutions (e.g. water user groups and local resource allocation systems) at the local scale. The RSAT includes aspects of basin wide hydropower sustainability at all levels.

Table 5 below uses the RSAT criteria and gives examples to demonstrate the dynamic nature of different levels of governance for hydropower development. This table can be used to complete the information in more detail for the assessment and can be adapted to meet different needs. Understanding different institutions with responsibilities at different levels will improve the quality of the dialogue process and risk assessment.

The RSAT is designed to focus attention on the interaction between different levels of governance. The table below can be adapted to enable more complex analysis if time and resources permit.

TABLE 5: EXAMPLES OF GOVERNANCE LEVELS AND HYDROPOWER PROJECT SCALES

	Governance institutions
A. River basin planning	
International	International River Basin Organisation (e.g. MRC), international donors, investors and NGO's
National	National water resource agencies, social planning agencies, economic planning agencies, national investors, etc
Provincial	Provincial water resource agencies, regional office of national agencies, fisheries agencies, social sector, agricultural etc
Local	District administration, local water user groups, fishing groups etc
B. Energy planning	
International	International Energy Planning Organisation (e.g. GMS), international donors, investors and NGO's
National	National energy agency, national investors, agencies across other sectors
Provincial	Provincial energy agencies and regional offices of national agencies, private and public electricity suppliers etc
Local	Local off grid electricity providers and consumers
C. Hydropower projects	
International	Large transboundary projects and export projects, integrated power trading systems
National	Large nationally significant projects
Provincial	All projects small to large scale
Local	All projects and micro-scale local projects
D. Regulatory and governance	
International	International agreements, conventions and institutions, international donors
National	National law, policies, regulations, administrative bureaucracies, national plans
Provincial	Provincial law, policies, regulations, administrative bureaucracies, provincial plans
Local	District administration, village administration, community level rules, norms, social relations, kinship relations, and on ground practices. Organised community groups and resource user groups.

Assessing basins with projects at different stages of development

The RSAT is designed to assess a basin which may have multiple projects, all at different stages of development (options assessment, project siting and design, preparation, construction and operation). The performance statements have been designed to cater for projects at all different stages. Many of the requirements relate to the basin planning and regulatory framework, which can still be assessed in the absence of any existing development in the basin. It is the role of the facilitator to ensure that the performance statements are interpreted in a way that suits the development context and project development stages in the basin.
If all projects in the basin are at the same stage of development, then the performance statements that relate to the other stages will not be relevant.

RSAT reporting and follow up stage
After the assessment is complete a report is prepared to present the results of the assessment. The report should be formally presented to the senior level planners and decision makers with key responsibilities in the sub-basin to gain endorsement and high level support for recommended follow up actions.

Templates are available to assist report preparation and ensure a consistent approach. The results are presented for each topic and the report includes a summary of the assessment process and recommendations for follow up actions.The key forms listed below are the forms that have to be filled out during the assessment and included as appendices to the report. The following forms are available electronically for the assessment panel to use:

- Assessment Information Sheet
- Completed data collection templates for each topic
- Topic assessment and summary sheet for Topics 1-10
- Evidence register
- The Evidence and Interviewee list

The lead institution that establishes and co-ordinates the RSAT assessment will also establish responsibilities for follow up actions amongst the key stakeholder groups involved in the assessment. The plan for follow up activities should be included in the conclusion section of the RSAT assessment report. Follow up actions should include a repeat RSAT assessment after a nominated period of time (e.g. 12 months) to track progress.

RSAT

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