Best Practice Guidelines for Integrated Flood Risk Management Planning and Impact Evaluation

The Flood Management and Mitigation Programme,
Component 2: Structural Measures & Flood Proofing in the Lower Mekong Basin

May 2010
Final Report, Volume 3B

Deltares
Enabling Delta Life
Delft Hydraulics

ROYAL HASKONING

UNESCO

Mekong River Commission

Flood Management and Mitigation Programme

Structural Measures and Flood Proofing in the Lower Mekong Basin

Best Practice Guidelines for Integrated Flood Risk Management Planning and Impact Evaluation

Volume 3B

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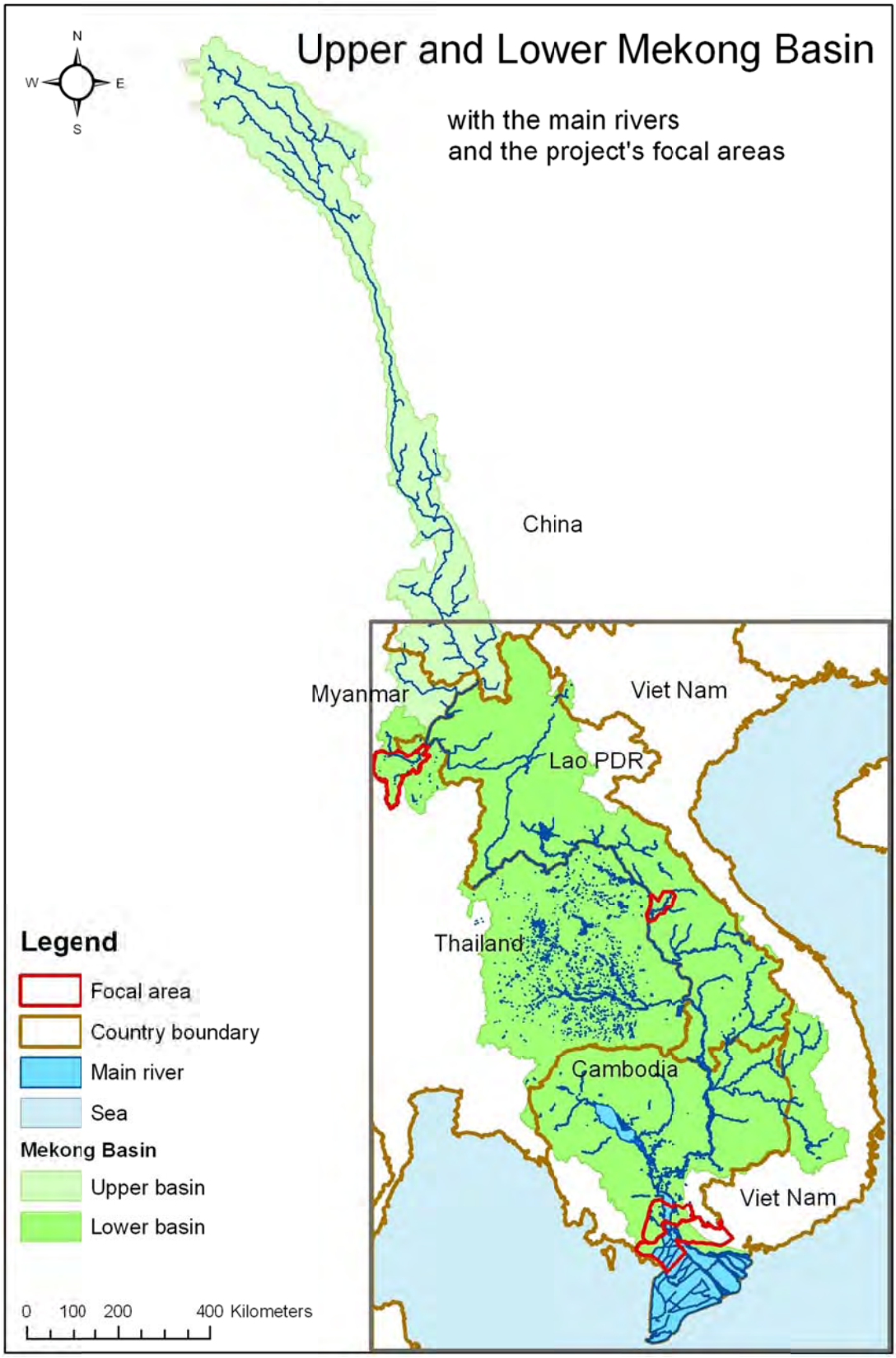

Upper and Lower Mekong Basin
with the main rivers
and the project's focal areas
N
W
E
S
China
Myanmar
Viet Nam
Lao PDR
Thailand
Cambodia
Viet Nam
Legend
Focal area
Country boundary
Main river
Sea
Mekong Basin
Upper basin
Lower basin
0 100 200 400 Kilometers

ABBREVIATIONS AND ACRONYMS

BDP	Basin Development Plan/Planning/Programme
BPG	Best Practise Guidelines
CBR	Cost-Benefit Ratio
EC	European Commission
ERR	Economic Rate of Return (an economic term)
EMP	Environmental management plan
FMM	Flood Management and Mitigation
FMMP-C2	Flood Management and Mitigation Programme 2004-2010, Component 2
GIS	Geographic Information System
GWP	Global Water Partnership
HH	Household(s)
IEE	Initial Environmental Examination
(I)FRM	(Integrated) Flood Risk Management
IRR	Internal Rate of Return (an economic term)
IWRM	Integrated water resources management
LMB	Lower Mekong (River) Basin
MRC	Mekong River Commission
MRCS	Mekong River Commission Secretariat
N/K ratio	Net benefit-Investment Ratio (an economic term)
NPV	Net Present Value (an economic term)
NPW	Net Present Worth (an economic term)
Lao PDR	Lao People's Democratic Republic
RFMMC	Regional Flood Management and Mitigation Centre (MRC)
RP	Resettlement Plan
SEA	Strategic Environmental Assessment
UNESCO-IHE	Institute for Water Education (IHE) of the United Nations Educational, Scientific and Cultural Organization (UNESCO)
USD	United States Dollar

GLOSSARY

Backwater	The rise in surface elevation of flowing water upstream from and as a result of an obstruction to flow. The difference between the observed stage and that indicated by the stage-discharge relation is reported as backwater.
Colmatage	The natural deposition of particles suspended in water on land areas, usually on rivers floodplains and deltas, coastal lowlands, and flooded meadows.
Compensation	The financial or direct enhancement, replacement, restoration, and/or restitution for victims of unavoidable negative impacts of project development. Funds may also be used to recreate lost habitat or other valued resources.
Cumulative impacts	Environmental impacts (usually negative) caused by multiple human activities and/or natural events which are either repeated or occur in combination.
Damage curve	The functional relationship between inundation characteristics (depth, duration, flow velocity) and damage for a certain category of risk.
Direct damage	All harm which relates to the immediate physical contact of flood water to people, property and the environment. This includes, for example, damage to buildings, productive assets, loss of crops and livestock, loss of human life, immediate and immediately foreseeable and calculable health impacts to the population in the flooded area and ecological harm.
Environmental enhancement	An intentional change which enhances the anticipated positive impact of a proposed project on one or more environmental components.
Environmental impact assessment (EIA)	An environmental assessment report prepared at the feasibility stage of project consideration. It consists of the systematic study of the environmental impacts of a proposed plan or project.
Environmental impact statement	The report resulting from the EIA process, comprising a comprehensive evaluation of the environmental and social impacts of the proposed activity, the significance of these impacts, potential alternative actions, mitigating measures and an Environmental Management Plan (EMP).
Environmental management plan	A plan for environmental activities during project implementation designed to ensure sound environmental management, minimising/ mitigating adverse environmental impacts and maximising beneficial environmental effects within the overall framework of sustainable development.
Environmental monitoring	Measurements over time of environmental components (often at regular intervals) to detect direct and/or indirect changes caused

	by specific project interventions.
Exposure	A measure of the people, assets and activities threatened by a flood hazard.
Flashiness	Term reflects the frequency and rapidity of short term changes in streamflow, especially during runoff events.
Flood control	A structural intervention to reduce a flood hazard.
Flood damage	Damage to people, property and the environment caused by a flood. it includes direct as well as indirect damage.
Flood damage risk (= Flood risk)	The combination or mathematical product of the probability of the flood hazard and the possible damage that it may cause. This risk can also be expressed as the *average annual possible damage* or *expected damage*. If it is expressed in a financial measure, it is the expected net present value using economic valuations with different measurement assumptions.
Flood hazard	A flood that may *potentially* result in damage. A hazard does not necessarily lead to damage.
Flood hazard map	Map of the predicted or documented extent/depth/velocity of flooding with an indication of the flood probability.
Flood proofing	A process for preventing or reducing flood damages to infrastructure, buildings and/or the contents of buildings located in flood hazard areas.
Flood risk management	Comprehensive activity involving risk analysis, and both identification and implementation of risk mitigation measures.
Flood risk management measures	Actions that are taken to reduce the probability of flooding or the possible damages due to flooding or both.
Flood risk map	Map with the predicted extent of different levels/classes of *average annual possible damage.*
Global Water Partnership	GWP is a global action network. Its chief focus is to support social change processes that further the sustainable management and development of water resources. To do this, the network invites like-minded organizations to join this global movement.
Hydrological hazard	A hydrological event (discharge) that may result in flooding.
Impact matrix	An array of rows (for project activities) and columns (for important environmental components) used for presenting the analysis of environmental impacts of a project.
Indirect damage	All non-direct damage which relates to the disruption of economic activity and services due to flooding including impacts on the non-flooded areas.

Initial environmental examination	The first stage in the EIA of a project, used for identifying and assessing possible environmental impacts.
Integrated flood risk management	The approach to flood risk management that focuses on the full chain of a meteorological hazard leading to flood damages and considers combinations of structural and non-structural solutions to reduce that damage.
Interested party	Stakeholder.
Mesocosm	A mesocosm is an experimental tool that brings a small part of the natural environment under controlled conditions.
Meteorological hazard	A meteorological event (storm) that may result in a hydrological hazard and, eventually, in flooding.
Mitigation	The elimination, reduction or control of an adverse (environmental) impact of a project.
Polder	A low-lying tract of land enclosed by embankments (barriers) known as dikes that forms an artificial hydrological entity, meaning it has no connection with outside water other than through manually operated devices.
Reach	Any length of stream between any two points.
Residual environmental impact	Any environmental impact that remains (or will remain) after implementation of the measures specified in the Environmental Management Plan (EMP).
Resilience	The ability of a physical system and of a human social system (at the level of community or society) to cope with the damaging effect of floods.
Scouring	The process generating local changes on the bed or banks of the watercourse.
Scoping	The initial process by which important environmental issues and possible alternatives are identified for the various potential projects.
Screening	Preliminary activity undertaken to classify proposals according to the level of assessment that should follow.
Significant environmental impact	An environmental impact which is sufficiently important (i.e. severe) to warrant specific attention in an EIA.
Socio-economic environment	All aspects of the human environment: social, financial/economic, cultural and historic.
Stakeholder	A person or organisation likely to be directly or indirectly affected by, or having an interest in, a proposed project. Stakeholders include the primary or principal stakeholders: residents of the

	project area (the general public and, especially, beneficiaries and those harmed, as individuals and collectively as ethnic groups and communities); and secondary (organisational) interests: community representatives (elected and traditional); non-government organisations (NGOs); local, regional and national government officials; technical specialists, and national and international funding agencies.
Susceptibility	The opposite of resilience; the inability of a human social system (at the level of community or society) to cope with the damaging effect of floods.
Sustainable development	The process of protecting ethnic groups and communities in a balance with their eco-systems such that population and per capita consumption are kept equal to productivity per unit resources and resources over generations. It can be achieved with or without 'growth'.
Vulnerability	The potential damage that flooding may cause to people, property and the environment.

REFEENCE SYMBOLS FOUND IN THE TEXT

The Flood Management and Mitigation Programme Component 2 (FMMP-C2) guidelines contain symbols in the left margins for quick reference. The symbols are of two types. They indicate:

A. Type of text/content; and
B. Project stages within the five consecutive project phases.

The goal of the symbols is to help readers to scan the text to look for theory, examples, or applications or to try to find information needed for work at specific project stages.

A) Text/Content Symbols: The report texts are categorised into four groups, as follows:

i) Project background/Report information
FMMP-project information and background, or explanation of the report structure or content.

ii) Theory
The theory behind the proposed/applied methods and guidelines.

iii) Example
Examples of the proposed/applied methods and guidelines.

iv) Applications and Guidelines
Methodology and theory adapted/applied to the Lower Mekong Basin (LMB), including guidelines. The guidelines are applied in one of the five project stages described below (B).

B) Project Stage Symbols: A project usually consists of five phases (see Section 1.3). The best practice guidelines developed by the FMMP-C2 cover only the second phase: project planning/development/design. This phase can be subdivided into five stages:

i) Preliminary/pre-feasibility study stage

ii) Feasibility study and overall planning stage

iii) Preliminary design stage

iv) Detailed design and detailed planning stage

v) Construction/bid documents stage

Any part of a guideline falling outside the scope of the five stages is marked with a white cross:

Sometimes more than one symbol may apply to a section.

CHAPTER 1

INTRODUCTION

1 INTRODUCTION

1.1 Guide to the reporting structure of the Flood Management and Mitigation Programme - Component 2, Structural Measures and Flood Proofing

The Mekong River Commission (MRC) implemented Component 2 on Structural Measures and Flood Proofing of the Flood Management and Mitigation Programme (FMMP) between September 2007 and January 2010 under a consultancy services contract between the Mekong River Commission Secretariat (MRCS) and Royal Haskoning, working in association with Deltares and UNESCO-IHE. The work comprised three periods, an Inception period and two Implementation periods. During each period, the consultants delivered a series of outputs and discussed them with the MRC, the National Mekong Committees, and line agencies of the four MRC Member Countries. A portion of Component 2 - on 'Roads and Floods' - was implemented by the Delft Cluster under a separate contract with the MRC. Component 2 included five Demonstration Projects which are presented separately.

The consultancy services contract for Component 2 requests, in general terms, four main products in addition to a Final Report. The reports produced as of the completion of Component 2 (FMMP-C2) are structured as follows:

Volume 1 **Final Report**

Volume 2 **Characteristics of Flooding in the Lower Mekong Basin**
Volume 2A *Hydrological and Flood Hazards in the Lower Mekong Basin;*
Volume 2B *Hydrological and Flood Hazards in Focal Areas;*
Volume 2C *Flood Damages, Benefits and Flood Risk in Focal Areas;*
Volume 2D *Strategic Directions for Integrated Flood Risk Management in Focal Areas.*

Volume 3 **Best Practice Guidelines for Integrated Flood Risk Management**
Volume 3A *Best Practice Guidelines for Flood Risk Assessment;*
Volume 3B *Best Practice Guidelines for Integrated Flood Risk Management Planning and Impact Evaluation;*
Volume 3C *Best Practice Guidelines for Structural Measures and Flood Proofing;*
Volume 3D *Best Practice Guidelines for Integrated Flood Risk Management in Basin Development Planning;*
Volume 3E *Best Practice Guidelines for the Integrated Planning and Design of Economically Sound and Environmentally Friendly Roads in the Mekong Floodplains of Cambodia and Viet Nam*[1].

Volume 4 **Project development and Implementation Plan**

Volume 5 **Capacity Building and Training Plan**

Demonstration Projects
Volume 6A *Flood Risk Assessment in the Nam Mae Kok Basin, Thailand;*
Volume 6B *Integrated Flood Risk Management Plan for the Lower Xe Bang Fai Basin, Lao PDR;*
Volume 6C *Integrated Flood Risk Management Plan for the West Bassac Area, Cambodia;*
Volume 6D *Flood Protection Criteria for the Mekong Delta, Viet Nam;*
Volume 6E *Flood Risk Management in the Border Zone between Cambodia and Viet Nam.*

This report is **Volume 3B** in the above series.

[1] Developed by the Delft Cluster

The FMMP Component 2, Structural Measures and Flood Proofing, was developed in three steps: the Inception Phase and Stages 1 and 2 of the Implementation Phase. The Inception Phase began at the end of September 2007 and concluded in accordance with the Terms of Reference with a Regional Workshop in Ho Chi Minh City at the end of January 2008, only 4 months after project initiation. The original TOR envisaged the Stage 1 Implementation Phase to be carried out in a period of 6 months, leaving 12 months for the Stage 2 Implementation Phase. See for reference *Final Report*, Volume 1.

1.2 Best Practice Guidelines for Integrated Flood Risk Management Planning and Impact Evaluation

These BPG are meant to provide guidance to policy makers and project planners in executing agencies within the MRC Member Countries and the National Mekong Committees (NMCs), as well as to managers in the MRC Secretariat, engaged in the preparation of Integrated Flood Risk Management (IFRM) strategic directions (choice of types of measures for flood risk management and damage reduction) and plans (choice of specific technical or tactical measures).

The work preceding such IFRM planning should be a competent risk assessment such as outlined in Volume 3A and this volume fits into the context of overall flood risk management that is set out in that volume. With risk assessment complete, the planning process encompasses the following steps:

- identification of possible measures for risk reduction (presented in Chapter 2);
- consultation with and participation of stakeholders (explored in Chapter 3);
- evaluation of environmental impacts (described in Chapter 4);
- evaluation of social impacts (described in Chapter 5); and
- evaluation of economic impacts (described in Chapter 6).

This guideline volume describes the key practices in each of these steps. It proposes an approach to the identification of IFRM measures and the assessment of social, economic and environmental impacts of structural flood mitigation measures in the LMB. It also summarises a variety of ways to involve the general public and other stakeholders in the planning, design and implementation of these measures

1.3 How to use the BPG Guidelines

The different countries in the LMB and institutions financing projects have varied policies, regulations and guidelines for project evaluation and preparation which include methods for social, economic and environmental impact assessments. This Guideline presents those assessment practices that are most useful and appropriate for flood management projects in the LMB. The proposed methodology endeavours to identify and, as far as possible, also quantify the socio- and environmental impacts of project proposals by comparing different scenarios with and without implementation of the proposed projects.

In order to facilitate management an engineering project, project managers normally divide projects into phases such as the following five phases:

1. Initiation;
2. Planning/Development/Design;
3. Production/Implementation;
4. Monitoring/Control;
5. Closure.

The Best Practice Guidelines are almost exclusively applicable to Phase 2: Planning/ Development/Design but can also be applied in the Initiation phase (project preparation) and in evaluation since there is always some important linkage between planning and initiation and planning and later evaluation. This phase, its stages and the associated symbols used in the guidelines are elaborated in Appendix 7 and briefly, above, in the report introduction.

1.4 Background to the development of the Best Practise Guidelines

This Guideline incorporates research from a review of social, economic and environmental impact assessments methods used in the MRC's Basin Development Plan Programme (BDP), and of impact assessment standards required by MRC Member Countries and their major donor agencies.

This volume also incorporates 'lessons learned' in the process of the formulation of strategic directions for research focal areas in the Stage 1 Implementation Phase of the FMMP-C2. Practices presented in this Guideline have been further tested and amended during Stage 2 FMMP-C2, especially through demonstration projects.

1.5 Purpose and scope

This BPG has been developed to summarise some of the essential data necessary for assessing the social, economic and environmental impacts of structural flood mitigation measures in the Lower Mekong Basin, and some of the approaches for involving the public and other stakeholders in both analysing and addressing these impacts.

The objectives of the BPG are to:

1. Provide an overview of available flood risk management measures and their relative impacts on flood risk reduction;
2. Provide an overview of social, economic, and environmental impact assessment procedures;
3. Identify the key elements that must be included in an impact assessment of structural flood mitigation measures;
4. Recommend strategies for stakeholder participation, including the general public in different stages of planning and implementing flood mitigation measure; and to
5. Provide sample tools and checklists that can be adapted and applied to each country and project context.

The Guidelines are designed to be of use to planners and project managers in MRC Secretariat, the National Mekong Committees and line agencies in the:

1. Formulation of strategic directions for flood risk management;
2. Planning and prioritisation of potential structural flood mitigation measures;
3. Screening and preparation of structural flood mitigation projects; and
4. Designing of projects and monitoring of their implementation.

Note that these Guidelines are only applicable to the assessment of social-economic and environmental impacts of structural measures for flood risk reduction. The socio-economic and environmental impacts of non-structural flood risk management measures are not addressed, as these have been addressed under Component 4 "*Flood Preparedness Management Strengthening*" of FMMP.

CHAPTER 2

PRACTICES FOR IDENTIFICATION OF INTEGRATED FLOOD RISK MANAGEMENT MEASURES

2 PRACTICES FOR IDENTIFICATION OF INTEGRATED FLOOD RISK MANAGEMENT MEASURES

2.1 Introduction

This chapter of the BPG for Integrated Food Risk Management (IFRM) planning and impact evaluation is meant to offer guidance in the process of identifying promising measures for flood risk reduction. Once such promising measures are identified and formulated, then the evaluation of the socio-economic and environmental impacts, (described in the following chapters of this BPG) can begin.

The initial identification of promising measures provides the "strategic direction" for the flood risk management in a certain area.

Promising flood risk management measures are responsive to:

1. the type of flooding (e.g., flash floods, Delta floods etc.); and
2. the risk categories (e.g., loss of life, agriculture, housing and business, public and industrial infrastructure).

The types of floods and the corresponding hazard assessment are presented in the BPG for flood risk assessment (Volume 3A of this series). That volume also describes different categories of damages.

2.2 Integrated Flood Risk Management concept

The management of flood risk and the resultant reduction of the damages address the full chain of events and circumstances that are part of that risk (from meteorological hazard to damage consequences).

Flood risk management aims at the reduction of flood risks, whereas the reduction of the eventual damage when flooding is imminent or has occurred is referred to as "disaster management" including response, relief, recovery and reconstruction.

The concept of IFRM as used in the guidelines can be illustrated as follows:

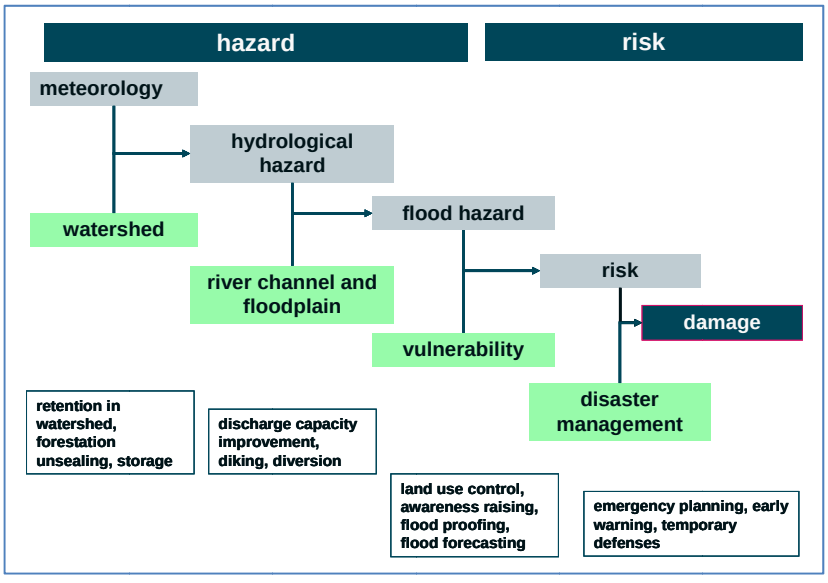


Figure 2-1 Scheme for flood risk assessment used in the FMMP-C2.

This IFRM concept is used to find the most cost-effective measure (or combination of measures) to reduce flood risks to acceptable levels. The assessment of the "acceptability" of the residual risk, however, is not part of the approach since acceptability is a matter of (political) judgement, legal obligations and (economic) affordability which all may vary between countries and regions.

The IFRM concept can also be used to find the most cost-effective measure (or combination of measures) to keep the flood risks acceptable in cases where land use changes increase flood risk (such as changes in the number of harvests per year or the construction of public or industrial assets in flood prone areas) or where flood hazards are increasing (for instance, due to climate change).

The IFRM approach provides decision makers with information on the most cost-effective ways to reduce flood risk. It is up to the decision maker to incorporate political judgments on acceptable levels of risk. From a purely economic point of view, risks are tolerated as long as the costs for reducing these risks are higher than the actual risk reduction that would result. Part of the complication, however, is in the measurement of costs, particularly where damages include the loss of life or where different interests of different groups are pitted against each other. In such cases it is sometimes more appropriate to set targets rather than define criteria in financial terms. For instance, a target to reduce flood risk of deaths by a certain amount or percentage over a certain period of time may be appropriate.

Note, again, that the application of IFRM concepts is only meaningful when there is sufficient understanding of the actual or future flood risks.

2.3 Types of flooding

The type of flooding is an important factor in the assessment of whether different types of measures are appropriate. The BPG considers measures for the following types of floods found in the Mekong River Basin and offers a brief description of these types of floods here. (For longer descriptions, see Volume 3A.):

1. Tributary floods;
2. Mainstream floods;
3. Combined floods;
4. Floods in the Cambodian Floodplain; and
5. Flood in the Mekong River Delta.

Tributary floods
Tributary floods occur in the steep sloped upper reaches of river basins. They are also called 'flash floods' and are caused by intense rainfall after a long rainy period and forcing the catchment to respond quickly. Flash floods are short lived (a few hours), rise and fall rapidly and have high flow velocities. Further downstream, the flashiness reduces due to damping and differences in the timing of the contributions of tributaries. Out of the backwater reach of the Mekong River, the tributary flood hazard is determined by the intensity of the river discharges and the downstream river conveyance capacity to handle these quick flows.

Mainstream floods
Mainstream floods are caused by high water levels in the Mekong River. They are a result of extreme river flows in combination with limitations in the downstream conveyance capacity of the Mekong River and floodplain.

Combined floods

Combined floods are floods in the downstream sections of tributaries, where the flood level is determined by a combination of tributary flow and water levels in the Mekong River that back up the tributary levels and impede drainage. When the water levels in the Mekong are high, backwater may flow into the tributaries. These floods are not short term like flash floods; they may stay for weeks. In the shallow areas along the Mekong River downstream of Vientiane, several lower reaches of tributaries face this type of flooding.

Floods in the Cambodian Floodplain

The floods in the Cambodian floodplain occur along the Mekong River downstream of Kratie to Phnom Penh, and include flooding around the Tonle Sap Lake and the Tonle Sap River that flows into and out from the Tonle Sap Lake. Floodwater levels are determined by the spill levels of the rivers, the floodplain conveyance in relation to the road infrastructure, and the existence and dimensions of embankments.

Floods in the Mekong Delta

The floods in the Mekong River Delta occur in the Mekong and Bassac Rivers and their floodplains, including the areas of colmatage canals that divert and control the flow from and to the rivers. In the Mekong River Delta, water levels rise slowly due to storage in the Tonle Sap Lake and in Mekong River floodplains. Flooding here is recognised as essential for soil fertility, biodiversity and aquaculture. At the same time, it hampers use of agricultural land. The flood levels in the Mekong River Delta downstream are essentially the result of upstream and lateral inflow, net rainfall in the delta and downstream water levels of the sea.

2.4 Damage categories

Another important factor in the assessment of the suitability of certain measures is the category of damage that is at stake. In Volume 3A, Chapter 3, a number of different possible damage categories and the various types of financial and other quantitative and qualitative measures have been described that can be used to assess them.

One way to group some of these risk assessment purposes is to place a number of types of damages into four damage categories such as the following:

1. **Loss of life and injuries**
   This category includes the number of people killed, missing after and injured by a flood along with treatment costs for injured persons and could also include other more hidden long-term effects.

2. **Infrastructure losses and relief costs**
   This combined category includes damage to everything ranging from public and private educational facilities and materials, medical facilities and materials and equipment, irrigation infrastructure, to riverbanks (in the form of erosion), fisheries infrastructure and equipment, transport infrastructure and equipment, communication infrastructure and equipment, industrial infrastructure and equipment, construction materials and equipment, and drinking water and sanitation infrastructure and equipment, along with the costs of rescue operations, support and relief.

3. **Housing damage**
   Housing damage includes completely damaged and destroyed homes, partly damaged or submerged houses, damaged roofs and other private property damage, losses to cultural and historical structures, offices, small industrial units, markets and commercial centres and warehouses, and

4. **Agricultural losses as an example of productive losses**
   Among economic losses to flooding are those to farming operations that are a result of flooding of rice growing fields and crops, flower and vegetable areas, other annual crops, perennial crops, large and small livestock and poultry, damaged agro-chemicals and erosion of farmland.

2.5 Guideline for identification of promising measures

Measures to reduce flood risks include those designed to reduce the flood hazard and those designed to reduce the vulnerability to those hazards. These can be considered in five different categories that can then be assessed using the different types of approaches described in Chapters 4, 5, and 6. They include both structural and non-structural measures to reduce the hazards and the vulnerability as well as emergency measures to reduce vulnerability once major flooding is imminent (disaster preparation). They are described briefly as follows:

1. Structural measures to reduce the flood hazard, fall into three categories: increasing water retention capacity; improving discharge capacity of floodwaters; and building protection on the floodplains.
   a. *Creation of storage and/or retention capacity* can include interventions ranging from improving small scale water retention at the level of fields to construction of reservoirs and restoration of natural river floodplains. This approach is relevant for all damage categories since storage of flood water reduces floodwater levels and flood duration. For example:
      i. Large reservoirs on a river mainstream, river tributaries and at confluences (for combined flooding) are usually built for hydropower but can also have a positive effect on flood risk reduction. In the Cambodian floodplains and in the Mekong River Delta the effect is essentially a substantial reduction of the duration of floods and flooding.
      ii. Small scale storage reservoirs on tributaries can reduce the local flood risk of tributary floods.
      iii. Storage or retention in river floodplains is a natural phenomenon and is to be regarded as a highly relevant 'natural' technique for areas with low population densities where the population is accustomed to 'living with floods'. This is relevant for areas prone to combined floods; the Cambodian floodplains and the Mekong Delta.

   b. *Improvement of discharge capacity by river and/or diversion works* can reduce flood levels and flood duration at least locally or at the regional level. However, care must be taken that upstream and downstream impacts are minor and damping out.
      i. River and/or canal widening or deepening reduces flood levels and has been an important intervention for the Cambodian floodplains and the Mekong River Delta,
      ii. Diversion of flood water is an important intervention in areas experiencing combined flooding. By creating a shortcut to the main river, floodwater flows downstream of the diversion can be reduced. Effective diversion of flood water in combination with the use of the storage capacity of the Tonle Sap Lake can also reduce flood durations in the Cambodian floodplains and in the Mekong River Delta by delaying the early flood. This reduces risk to the second rice crop. It can also have the beneficial effect of storing water for release in the dry season; thus augmenting the water available for irrigation and repulsing sea water intrusion in the delta.
      iii. Diversion of flood water from the Mekong and Bassac Rivers towards the Gulf of Thailand may be an option in the distant future situation when the desired level of flood protection in the delta increases.

c. *Dyke construction and/or polder schemes.* These approaches can be relevant for reducing hazards to all damage categories, though polders are much more relevant than dykes.
   i. Dykes (embankments along a river) do not necessarily create polders since dykes have openings (for example at the locations where canals connect to the river) and the level of flood protection is substantially less than with polders.
   ii. Polders are different from dykes in that they consist of a closed dyke ring rather than just an artificial embankment extending along a river and have two key features: i) polder embankments consist of a fully closed system with control structures at the canal connection points with the river; ii) a drainage system for the polder area is provided to evacuate the excess rainfall while water intake in the dry season is made possible through inlet structures. Polders are relevant for areas with combined flooding, the Cambodian floodplains and the Mekong Delta.

2. Structural measures to reduce flood vulnerability usually seek to fortify buildings and infrastructure by *flood proofing.* This approach is relevant to most damage categories except agriculture. Flood proofing has historically been ap*plied by the population accustomed to 'living wi*th flooding'. Any flood risk reduction plan or project should include flood proofing measures in its analysis of alternative solutions in providing measures that reduces flood risk in a certain area. Flood proofing is relevant for all types of floods.

3. Non-structural measures to reduce flood hazards, can include various types of ecological and landscaping management such as:
   a. *Watershed management*. This is an important approach in areas affected by tributary floods.
      i. Watershed management primarily aims at 'keeping the rainfall as long as possible within a river catchment before it becomes run-off'.
      ii. Watershed management requires essentially a 'political will' to address the state of deteriorated natural river basins in the form of land-use regulations and their enforcement. It is particularly important for tributary river basins
   b. *Forestation*. In the medium to long term, forestation is essential to reduce flood risk, for all types of floods and can have positive impacts on all flood damage categories.
   c. *Unsealing of artificial surfaces.* Overall, artificial 'sealed' surfaces (areas of buildings and infrastructure) create very rapid rainfall - run-off but constitutes only a marginal fraction of land areas in the LMB. Most sealed areas are in cities and towns. Unsealing of artificial surfaces for flood risk reduction is not a high priority in the LMB, but consideration of the impacts of sealing as areas rapidly urbanise is important in overall risk management planning.

4. Non-structural measures to reduce flood vulnerability are directed at behaviours that put people in harm's way. These include long-term planning decisions as well as mechanisms and planning for individual preparations for floods in advance or around the time of potential flooding.
   a. *Land use controls*. Land-use zoning plans that stipulate what type of activity is allowed or restricted in flood prone areas and their implementation and enforcement can have major implications. Simple sustainability planning for population growth can reduce the numbers of people facing risk.
   b. *Awareness raising and behavioural changes*. Floods are by definition erratic events but individual preparation can greatly reduce individual risk. Raising the awareness of the flood prone population and changing several types of behaviours is crucial in mitigating their long-term and short-term vulnerability. FMMP Components 4 and 5 address some of these issues in detail.

c. *Flood forecasting*. Flood forecasting is essential in the LMB especially in the upper and middle reaches of the LMB where large numbers of people are vulnerable to floods.
   i. While the Regional Flood Management and Mitigation Centre (RFMMC) has the right tools for flood forecasting for the mainstream, the challenge still is to disseminate the warnings quickly and effectively to the flood prone areas.
   ii. Forecasting of the imminence of flash floods that can occur in tributaries as a result of typhoons or major depression storms originating from the East Sea is high on the agenda of the RFMMC.

5. Disaster management measures aiming at the reduction of the damages once flooding is imminent. Vulnerability of individuals can also be reduced through warning systems and planning for phases of response, relief, recovery and reconstruction (together comprising 5 of the 6 phases that are usually considered the key to 'disaster management' beyond 'prevention and mitigation' that include reducing hazards and general vulnerability). Examples of areas to focus upon include:
   a. Early warning systems, Flood forecasting and early flood warning are key components of the MRCS RFMMC, under FMMP Component 1.
   b. Emergency planning. Planning procedures for emerging flooding threats depend on the line agencies that are responsible for dealing with disasters.
   c. Temporary resource mobilisation systems. These systems are designed to reduce overall damages through appropriate rapid activity in the phases of response, relief, recovery and reconstruction.

   Since FMMP Component 4 *"Flood Preparedness Management Strengthening"* addresses disaster management, these approaches to vulnerability are not the focus of this volume. Flood forecasting is addressed in Component 1 *"Establishment of Regional Flood Management and Mitigation Centre"* of the FMMP.

CHAPTER 3

PRACTISES FOR STAKEHOLDER PARTICIPATION

3 PRACTICES FOR STAKEHOLDER PARTICIPATION

3.1 Introduction

The MRC has made the involvement of public and the public opinion in the work of MRC a prerequisite for the sustainable development of the Mekong River Basin. The MRC is aware that stakeholder involvement in decision making is fundamental to achieving feasible, equitable and lasting solutions in water management and that the quality of these decisions can be improved by the inclusion of a broad range of public stakeholders who can bring important local knowledge and relevant perspectives to the process[2]. The MRC has affirmed the commitment of the Global Water Partnership:

> 'Water is a subject in which everyone is a stakeholder. Real participation only takes place when stakeholders are part of the decision-making process. This can occur directly when local communities come together to make water supply, management and use choices.
>
> (Global Water Partnership)

Public participation is the second of the so-called Dublin Principles, which form the basis for Integrated Water Resources Management (IWRM), as promoted by Global Water Partnership: 'Water development and management should be based on a participatory approach, involving users, planners and policy makers at all levels' [3].

3.2 Purpose of these Best Practice Guidelines regarding stakeholder participation

The guideline is intended for anyone who will be engaged in facilitating or conducting stakeholder participation exercises with aiming for the stakeholders to influence the planning and design of flood risk reduction measures or any other investment activities within the IWRM framework.

This guideline has been prepared on the basis of:

a. review of other guidelines in the field of flood risk assessment and water management;
b. review of existing practices in public participation at MRC; and
c. experience gained during the preliminary stakeholder consultation in West Bassac River, Cambodia and Lower Sae Bang Fai River in Lao PDR's FMMP-C2 project focal area.

Flood protection measures, apart from reducing the risk of damage to houses, property, and creating better living conditions for the people, can also bring economic benefits through improved land use and agriculture. A concrete public participation plan is crucial to ensure that the needs of community and stakeholders supporting the community are incorporated in the design of projects and that support systems are put in place to adapt to the benefits and losses to different groups that are brought by these changes.

3.3 Why public participation?

Public participation improves the effectiveness of flood management measures by assessing and integrating the needs and concerns of those vulnerable to flood damage into project design and outcomes. As flooding brings benefits and potential damage, the advantage of structural

[2] MRC – Public Participation Plan in Lower Mekong Basin
[3] MRC - Public Participation in Basin Development Plan

flood protection measures can only be assessed in interaction with communities living in flood affected areas and by incorporating their needs for and rights to living sustainably with their environments.

For flood prevention, protection and mitigation of damages immediately before and after flooding, an appropriate combination of structural measures, preventive measures and operative measures during flood events is necessary. As noted at the end of the previous chapter (see Section 2.5), appropriate land use and sustainable development planning for each community, adequately designed natural floodplain protection, appropriate flood-control structural planning, structural planning to reduce vulnerability, and damage mitigation activities including early-warning systems, correct risk communication and preparedness of the populations on how to act during floods are among the five categories of interventions needed for reducing flood hazards, vulnerability and mitigating damages. In some cases even relocation of extremely endangered activities and buildings may be advisable. All these can be achieved only through a meaningful participation of all concerned.

Public participation can have a number of benefits in improving the quality and sustainability of projects:

- Participation recognises the public's true ownership over public project investments, in ways that can transfer actually management authority to public owners such that they may be able to take care of facilities constructed in their names in their communities.
- Transparency in providing information about project plans builds trust and reduces opposition to those appropriate changes that the project will bring.
- Transparency in public spending and international loans builds local ownership and trust that money is being spent for the benefit and goals of local communities.
- Since structural measures cannot protect all areas, engaging people in identifying the most vulnerable areas for investment, and assessing the trade-offs in resource allocations contributes to a sense of fairness in public decision-making.
- Projects may fail without the knowledge that local communities can bring to specialists about local conditions. People have knowledge about their communities that often can only be assessed through direct interactions at the community level. Without this information, an analysis of a project cost and benefits is incomplete and possibly faulty.
- Understanding local community perspective on their vulnerability, their coping mechanisms and their livelihood planning is essential to assessing the best mix of options between structural and non-structural measures within an IFRM approach.
- Participatory monitoring of project implementation relies on communities to contribute to quality assurance and increases accountability in the use of public funds.

3.4 What is public participation?

The MRC has defined public participation as a process through which '*key stakeholders*' gain influence and take part in decision making in the planning, implementation, monitoring and evaluation of MRC programs and projects.

This definition is adapted from those used by multilateral financing institutions such as the World Bank and Asian Development Bank. Most definitions of participation by such institutions and by government bureaucracies around the world that have policies or legislation in place on participation include the concept of stakeholders sharing in decision making.

The term public is often taken by these bureaucracies to mean any individual or group in society, including the government and business sector. Who or what is included in the "public"

depends very much on the activities under consideration. The term "stakeholder" helps clarify the meaning of "public" in the context of development activities:

A 'stakeholder' is considered to be any person, group or even an institution that has an interest in an activity, project or program. This includes intended beneficiaries and intermediaries, those who will be positively affected, and those involved and/or those who are generally excluded from the decision-making process.

The MRC does not define who stakeholders are in the region or the categories of stakeholders that fit the concerns of international laws, local laws or best practices, though the MRC recommends starting, for example, with communities and ethnic groups (the 'primary' or 'principal' stakeholders), following international law. Instead, the MRC identifies a 'process' to use for identifying stakeholders that officials in power can use starting with these 'primary' stakeholders and then looking also at a second, separate category of 'secondary' stakeholders (institutional interests). This process is described below in Section 3.9.3.

'Participation' of these stakeholders is to be something more than consultation. Participation requires that stakeholders at all levels have an impact on decisions at different levels of water management. The quality of participation determines the success of the public participation process in incorporating the needs of all the stakeholders, particularly the intended beneficiaries. The methods and approaches are described below in Sections 3.6, 3.7, and 3.8 (theory of participation methods, short list of methods, and levels of participation) after noting some of the methods used by the governments of the MRC Member Countries.

A consultative process such as questionnaires, stakeholder meetings does not necessarily allow real participation if they are only employed to legitimize decisions already made. Hence, a clear purpose of public participation becomes very crucial.

A participatory approach is the only way of achieving long-lasting consensus and common agreement. However, for this to occur, stakeholders and officials from water resources and management agencies have to recognize that the sustainability of the resource is a common problem and that all parties are going to have to sacrifice some of its desires for the common good.

Participation is a process of responsibility and of recognition of rights. In the area of water resources management, actions in different sectors all have implications for water users and for groups vulnerable to water related disasters as well as to their aquatic ecosystems. At the basis of flood risk management are shared goals of lessening water related disasters, improving the efficiency of water use, and allow the sustainable development of the resource while also balancing community rights to diversity, protection of traditions and sustainability according to universal human principles.

To describe some of these responsibilities and protections they imply for weaker groups and interests that are often harmed even with participatory procedures, some important principles are listed below.

Principles of Public Participation

1. All the stakeholders should be able to influence the decision making process equally.
2. The participation process communicates the interests and meets the process needs of all participants.
3. The public participation process should facilitate the involvement of all those potentially affected.
4. The public participation process involves participants in defining how they participate.
5. The public participation process communicates to participants how their input was, or was not, utilized.
6. The public participation process provides participants with the information they need to participate in a meaningful way.
7. Maintain honesty and integrity throughout the process.
8. Recognize community knowledge.
9. Use cross-cultural methods of communication.
10. Institutionalize meaningful public participation by acknowledging and formalizing the process.
11. Create mechanisms and measurements to ensure the effectiveness of public participation.

Note that participation will not always achieve consensus. Legal protection, arbitration processes or other conflict resolution mechanisms might also need to be put in place to resolve differences in ways that offer the highest standards of protection in keeping with international principles.

Public participation also adds costs to project planning. Community consultations and information dissemination require time and financial resources as well as professionals trained in facilitation of community meetings and in understanding local communities and their long term sustainability. Discussions on resource allocations and land-use changes in public forums can also open up conflicts and raise concerns. For this reason, the development of a public participation strategy is needed early in project planning to clarify about the communities' roles and the time and means of participation. The public is obviously involved when infrastructure is constructed in their area or on their lands. Preparing a strategy for their direct engagement as opposed to dealing with lobbying, opposition or public concerns as they arise, results in more effective project planning.

3.5 Existing public participation practices in the Lower Mekong countries

The MRC's 1999 Public Participation Policy recommends the integration of public participation in all MRC programs.

Public participation is also mentioned in national documents and in select practices in the riparian countries.

- The Lao PDR Constitution offers a sentence that State organisations and government officials 'must disseminate and create awareness of all policies, regulations and laws among the people and, together with the people, organise their implementation in order to guarantee the legitimate rights and interests of the people.
- Viet Nam leaders have printed a number of documents under the titles of 'decrees' and 'national programme strategies' that mention approaches such as community consultation and participation in what they call 'socio-economic development' and 'poverty reduction' programmes. One document that they call the 'Grassroots Democracy Decree' asks that

commune authorities publish and publicly discuss commune plans, budgets, and expenditures describing their decisions with their minimal local revenues.
- In Cambodia, local bodies known as 'Commune Councils' may consult with community members in preparing a 'Commune Development Plan' that can receive central government financing.
- Thailand prides itself an active civil society that directly engages with elected representatives and partly with non-elected arms of government and authority in social, economic and infrastructure programs that affect their communities.

Public participation for project preparation should build on the existing mechanisms of public consultation in the MRC Member Countries as well as incorporate local developing plans where those plans reflect principles of sustainable development planning and resource management. Where local representative bodies exist that are directly accountable to local communities and able to protect the sustainability and traditions of those communities without interference, reinforce the role of these local government or local elected councils as the convenor of public forums in their jurisdictions. Public participation processes also involves consulting with community-based organisations and other civil society groups that represent members and/or vulnerable groups.

3.6 Define the purpose of public participation

Planners and stakeholders need to define clearly what they want to achieve at the end of the public participation process, based on the public participation principles adopted at MRC.

Certain key goals for participation are already established in the international framework and these can be an easy basis for establishing which information and discussion can be needed from public stakeholders. The international legal framework of the United Nations has established protection of ethnic diversity (the sustainability of different communities in all of their political, social and economic choices) as a fundamental of the international system. Different treaties that have been signed by MRC Member States reinforce this goal of sustainability of communities within their environments. The assurance that each group will continue to protect its differences over the next two generations (achieving a balance of population and consumption with productivity and resources within its resource base) is a key framework in which to see information on impacts and how they affect the viability and identity of communities.

Parties keep a written list of these and other objectives with a focus on what is needed for the particular task (and what may provide some useful footholds for future activities). Note that formal engagement exercises are usually constrained by time, resources and the willingness of stakeholders to respond. It is up to planners to take the initiative in offering information honestly, fully, and accountably, as noted in the list of principles, to spur an open, candid, equitable decision-making process.

Below are some of the key questions on specific purposes of meetings.

Key Questions for defining the purpose: How can planners assure …

- a better understanding of the real issues among all stakeholders in flood management?
- that stakeholders offer help and advice, resulting in a better policy/decision?
- a better strategy for dealing with floods?
- a long-term perspective that will help prevent potential long-term problems with structural measures for flood protection?
- compliance with a statutory requirement and with international legal principles and rights treaties?
- that they will be fully respectful and protective of the rights of stakeholders who may be negatively affected by a structural measure and who may deserve extraordinary protection and compensation in keeping with their rights, rather than act out of self-interest, conflicts of interest or indifference?
- a respectful long-term relationship with stakeholders?
- a large amount of significant, quality feedback?
- detailed, carefully considered comments from experts?
- greater acceptance of the ultimate solution?
- a decision?

w

Parties troubleshoot their planning before contacting the public, asking questions, such as 'What if the process suggests that my plans are completely misguided and not in keeping with international frameworks for community development or sustainability?' What alternatives are there? What will be the implications for others?

3.7 Public participation methods

In the past, participatory approaches have suffered from a certain naiveté among managers and development workers, who believed that the goals of participation could easily be achieved through simple methods of consultation and communication.

Experience has shown that without rigorous methods and tools that meet goals for sustainable development of each local cultural/ethnic group and also pay attention to individual rights protections, participatory processes will become ineffective, and the results could in fact be detrimental to the needs of people and of the natural resources on which they depend.

While stakeholder approaches are necessary parts of the participatory process, they do not necessarily ensure that a given process is participatory, equitable, fair, or that it promotes international and good governance goals of sustainable development and resource protection. In order to respect the principles of participation, planning and management initiatives require a wide range of methods and approaches, rooted in an understanding of the purpose of governance for sustainable development at the level of each cultural group within their resource base, and not merely of stakeholder identification and analysis of their short term views. Within the broader participatory process, stakeholder approaches have their particular function, and they should not be expected to deliver more than what they are intended for.

In the application of tools and measures, it must always be accepted that participatory approaches, including stakeholder identification and analysis, do take time and resources, and that they require flexibility and cultural empathy with local communities. A participatory process is a phased process that must be responsive to the needs, expectations and capacities of the participants.

Stakeholder approaches must be sensitive to the cultural context and long-term concerns of communities in which they are developed and applied. While the principles of participation are universal, the practice of participatory planning and management must take into account the principles, communication style, knowledge and skills of all stakeholders in the context of their long-term needs within their eco-systems for sustainable development.

The use of stakeholder approaches inevitably results in a broadening of the planning agenda consistent with the long-term goals of good governance for protections. When needs and interests of stakeholders are placed on the planning table, and when the marginal and powerless are given an opportunity to participate, planning initiatives are forced to incorporate the cultural, social, economic and environmental context that are at the very heart of good governance and responsiveness to diverse needs and priorities. Managers and facilitators need to embark on such processes with open minds since the form and outcome of the process are likely to be very different from what many current approaches to 'development planning' that simply look at 'investment' and economic returns rather than long-term sustainable development protections and needs.

3.8 Public participation methods shortlist

Many governments already have processes of public participation, accountability, and responsiveness built directly into their political and legal systems such that there is no need to establish a new consultation or outreach process each time that new public investments are under consideration. Some governments also have established planning processes for sustainable communities that routinely consider different types of investments and their impacts on the sustainability of those communities. Since that is not always the case in the MRC Member Countries, a number of 'on-the-shelf' public participation methods that can be adapted depending on the purpose, stage of a project (concept, planning or implementation) and the participation framework at respective Government and NMCs.

Top-down public participation methods initiated by authorities can be broadly classified into three groups of activities: Awareness and Education, Input Solicitation and Public Decision-making. Within each of these activity areas there are a variety of approaches that can be explained in turn.

- Awareness and education methods:

  Awareness methods are sometimes used to encourage public participation, to increase the awareness of public on planning and participation activities and build their capacity to become further involved. Education methods are employed to help the public better understand technical issues and long term consequences such as the flooding patterns and trends and impact on land use and livelihoods. The public can then provide input to identify those issues related to agriculture, fisheries and livelihoods development in their area that are most important to them.
  These methods can be used at all the stages of the project.

  Displays and exhibits: Maps, pictures and text can be arranged in a poster style and posted in public places in the affected area or during meetings to share information with the general public.

  Direct mail: Direct mailings of written materials work best when the message is simple and an audience is easily identifiable.

Community Calendar: Calendars can be placed at community offices such as government committees or non-governmental organisations and resource users groups with important meeting dates and information about the planning process.

Newsletter: Newsletters may be distributed at various planning stages to keep the public informed and educated throughout the planning project.

Public Education Meeting: Public educational meetings can build the capacity of the public to participate more effectively and to combine education and information through seminars, presentations, simulations and informal discussions.

Websites: The Internet is a tool to share information with the general public and stakeholders. Maps, reports, meeting agendas and minutes, contact information, and many other types of information can be presented on the Web. The Internet also supports interactive participation, such as on-line voting, planning chat-rooms, and Internet maps that can be used to create planning maps in localities.

Media Liaisons: Members from the media can be invited to participate as non-voting members on area planning committees to promote coverage in local newspapers and radio stations.

- Input solicitation:

  There are a number of approaches designed to gather public opinions and expertise.

  Public Notices: Regulations usually establish the minimum legal requirement for 'public notice' (the minimum number of days prior to a meeting) necessary to advertise opportunities for public participation. Notices are usually posted in public places and newspapers.

  Open houses: Informal settings offering displays, handouts and other materials can promote the exchange of planning information and ideas. Open house meetings provide stakeholders a chance to react to and express feedback about planning information in oral or written form.

  Public hearings: The minimum legal requirement for public participation is an official meeting used to present technical information and obtain formal review and approval of proposals. Hearings usually include: 1) a summary of why a project is being considered; 2) the alternative solutions identified; 3) an assessment of the consequences and impacts of each solution; and 4) opportunities for reactions to the proposed course of action. An official, permanent record of the public hearing is usually maintained for inspection.

  Visual preference surveys: Sometimes pictorial surveys are used to ask stakeholders to consider 3-D models or photographs of design alternatives or landscapes they prefer or find appropriate.

  Opinion surveys: Questionnaire can be used to collect data or viewpoints from large samples. Samples must be chosen carefully to represent appropriate population and survey design should follow professional procedures (of sociologists or research organisations).

  Focal Groups: Focal Group techniques elicit information from a small group of people (usually 6-12) to identify issues, concerns, values, beliefs or information related to a particular issue through a detail discussion format. Participants often are selected based on

their knowledge of a particular subject. Focal Groups require a skilled facilitator and active participants.

Visioning: This technique allows stakeholders to develop a vision that reflects community values and depicts what they want the future to look like using text, speech, images, or a combination. It can be integrated with actual data on population, resources, consumption and production for sustainable development planning.

Cognitive geographic mapping: Cognitive geographic mapping measures participants' spatial perceptions or preferences. Using a GIS, individual results can be compiled into a single composite map that helps decision-makers interpret shared public preferences. For example, stakeholders may draw on a base map (digital or hardcopy) to identify areas that will be positively or negatively impacted by floods and flood control structures for residents, agriculture, fisheries and the ecosystem.

- Public decision-making methods: In addition to political and legal system alternatives for regular public participation, control, and accountability of government (that are not discussed in this chapter) there are also ad-hoc (independently initiated one-time) methods to invite public decision-making on specific decisions. These methods can include:

  Advisory Committees: Committees are often used to gather information on a specific area of planning, such as natural resources by welcoming public technical expertise. An advisory committee can also sponsor a planning process. However, public participation is still limited by such committees. For example, a planning commission still has the legal responsibility to review and recommend any plan brought by a public advisory committee.

  Planning Commissions: Appointed or elected members of planning commissions can be authorised to prepare a comprehensive plan and to recommend the plan's adoption to a governing body. Commissions do not often have authority to adopt plans. They can oversee a planning process, put public participation efforts in motion, and ensure proper representation of local stakeholders.

  Referenda: Binding referenda can empower stakeholders to make policy decisions by majority vote. Non-binding or advisory referenda record stakeholders' votes for advice to local governments on a policy decision.

  Interactive Geographic Information System (GIS): A GIS equipped with land-use information, on fields, land cover, roads, surface water, and flooding scenarios can address planning concerns. The GIS, plus land use and flooding data, can help identify areas suitable for agriculture development, areas impacted by loss or increase in fishing opportunities, impact on nature reserves or damage to conservation sites such as parks and natural sanctuaries. They can test different scenarios and show immediate impacts to enhance decision-making at public meetings.

- Combining methods:

  A single method alone cannot achieve a planning task or engage all stakeholders equally. A combination of methods can be implemented depending on the situation and to assure that members of the public are reached since different stakeholders have access to different communications channels.

Appendix 1 offers a participation tools matrix to help in selecting tools or methods based on cost, time and suitability.

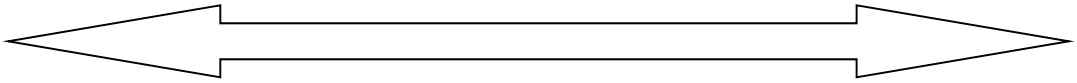
3.9 Level of participation

The level of participation depends on the purpose of public participation and the political context in which it is offered or imposed. It can range from a top-down process of information sharing with no role for stakeholders to influence any decision to complete empowerment of the stakeholders, wherein they also become part of the decision making process and project implementation, with both of these approaches containing hidden dangers.

Selection of a level of participation is recommended that follows international legal obligations and fits the framework of community protection (particularly sustainability of ethnic groups) and resource protections, rather than a choice based on political expedience or narrow (or conflicts of) interests.

Each level of the Public Participation Continuum shown below describes a "level" of participation. The appropriateness of the level of participation to choose from is a legal question, consistent with international legal objectives and the impact it will have on people, nature and environment. If the decision is not controversial and will not create winners and losers, then informing the public and stakeholder groups of the proposed decision and its rationale through a press release or advertising campaign may be all that is required to be consistent with law. If, however, the decision will likely create controversy or affect a large segment of stakeholder groups, then the decision-making organisation should consider using a more sophisticated approach to participation if it wishes to follow the law or if it is considering risking its own approach to protecting its own interests. As a general legal rule: the more significant the impact, the greater the need for public participation.

Table 3-1 Participation level by type.



Information Sharing	Consultation	Collaborative Decision Making	Empowerment
Top-down decision making by most powerful stakeholders who inform some of the other stakeholders of some decisions.	Most powerful stakeholders present tentative decision for discussion.	Joint analysis but final decision still with most powerful stakeholders.	Inputs, analysis and decisions made with equal involvement of all stakeholders, protecting due process rights.

Structural measures for flood protection impact a variety of stake holders in a river basin. The potential impact will be different for communities and individuals depending on different livelihoods options adopted like agriculture and fishing. It will be, similarly, also different for Government departments such as Department of Water Resources and irrigation and Department of Fisheries or Agriculture. Since structural flood protection measures will have greater impact on a variety of stakeholders group, a higher level of public participation is necessary to reach appropriate decisions.

3.10 Stakeholder participation action plan

The first step for planners acting top-down to control an ad-hoc public participation process in to prepare an action plan for stakeholder consultation and participation on specific issues that fall outside of normal political and legal public accountability mechanisms. The starting point for any action plan is to define the purpose with the context of sustainable development planning (balance of population, consumption, production and resources) followed by stakeholder

analysis which describes all the potential communities and ethnic communities and then individual interests. The greater the stake of different public interests, and the less influence they have on the outcome through normal channels, the greater the need to engage them in a participation process.

A stakeholder participation action plan can be structured in any preferred form of work plan but should include the following elements:

Table 3-2 Elements of a stakeholder participation action plan.

Question or concern to be incorporated	Action Plan
What decisions or outcomes are expected from public participation?	Define the purpose and scope of public participation based on the levels of participation identified and placed within the overall context of rights and sustainability protections.
Who must be involved to arrive at the decision or outcomes?	Identify and prioritise the target communities and individual categories/groups (children, women, disabled, elderly, farmers, etc.) for public participation forums using the stakeholder analysis.
What is the most effective means to interact with these groups and interests? Are there existing forums or events through which the target groups can be reached?	Organise the categories/groups by their locality (e.g., village meetings), or mandates (local public officials, NGOs) and the most feasible means to reach each group within the time frame and budget. Define the specific activities (meeting, workshop, brochure, media broadcast or advertising supplements) required to reach the target participants.
What are the level of education, understanding of the issues, language and cultural background of the target participants?	Identify the most appropriate tools and methods for communicating and facilitating feedback from the target groups. Research programs – of NGOs, local government, mass organisations or community-based organisations – that have conducted public participation forums in the same locality. Community development professionals experienced in communication and facilitation may be needed to adapt participatory tools to the locality.
What are the timelines, budget and human resources available to conduct the public participation activities?	Evaluate the costs of the defined activities, tools and methods. Finalise the activities and number of participants based on the costs and the resources available for the process.
What skills and perspectives are needed in facilitating participation and do those responsible for the process have those skills and perspectives?	Determine who will facilitate the participatory process. In some cases, experienced facilitators and social scientists can be hired to help with the process and interpretation of necessary information and of the information received. In other cases, line agencies, local officials or community representatives can lead the activities directly. A training needs assessment and Training of Trainer process may be required to prepare those who will undertake the participatory exercises and appropriate, culturally sensitive, analysis of the results.

Appendix 4 presents an example of a public participation plan. Plans may need to be updated during implementation of different stages of a project.

The following section describes in detail the stages in a public participation process.

3.11 Stages in public participation

Public participation has various stages depending on the type of project and level of engagement that is feasible at each stage of the project cycle. The essential stages are:

1. Stakeholder Analysis;
2. Information Dissemination;
3. Information Gathering;
4. Consultation;
5. Participation in decision-making;
6. Public awareness of disaster risks and disaster preparedness; and
7. Community mobilisation for operation and maintenance of a project.

For IFRM, the first five elements are of key importance. Stage 6 applies to flood risk management measures seeking to reduce vulnerability. An overview of the first five stages is presented below.

3.11.1 Stakeholder analysis

Stakeholder analysis is the identification of a project's key stakeholders, an assessment of their interests, and the ways in which these interests would be affected. It is linked to both institutional appraisal and social analysis: drawing on the information deriving from these approaches, but also contributing to the combining of such data in a single framework. Stakeholder analysis contributes to project design by helping to identify appropriate forms of stakeholder participation.

As a first step in the social assessment process, it is important to conduct a stakeholder analysis in order to:

- identify the ethnic groups and communities affected by the project and the categories of individuals who will be affected (by age, gender, profession, disability and other characteristics), as well as the formal institutions that “have a stake” in the project and the implementation of the IFRM measures; and
- analyse the nature of their interest in the project, how each of them defines the problems to be addressed and the resources they can bring to achieving the objectives of a IFRM project.

As noted, the stakeholder analysis is among the first steps in addressing the social issues of a IFRM project. It should be prepared at the beginning of work on the formulation and design of the project. Moreover, throughout the process of planning and implementing the project, whoever is in charge of governance and the project should continually review and update the public participation process and stakeholder analysis in order to confirm the involvement of stakeholders and keep track of changes in their circumstances and interests. This will facilitate the planning for the involvement of stakeholders in different aspects of the project.

Once stakeholders are identified, there are several key steps to assure that consultations are effective, open and fair. Some of these are listed below.

Critical elements for conducting stakeholder consultation:

Preparation

- Decide on the type of meetings with stakeholders.
- Decide on the venue.
- Prepare briefing materials on the project.
- Educate stakeholders for equal participation consistent with legal protections and due process principles.
- Provide a facilitator who is sensitive and trained in social aspects and facilitation.

Participants

- Identify key stakeholders.
- List the important concerns using an open-ended stakeholders analysis.

Logistics

- Meeting venues should be easily accessible to all.
- Facilities for meetings should promote openness and safeguard participants from stigma, fears of retaliation, pressures, and other concerns.
- Meetings should provide for the lifestyle needs and concerns of the participants and assuring they feel safe and free to participate in their own languages and with sensitivity to cultural concerns while also achieving results.

Communication

- The time of day and week should be suitable to stakeholders.
- Communications should occur in an atmosphere of equal participation that assures all people can be understood in their languages and terms.

Methods

- Choose appropriate method based on the type of stakeholders.

Generally, in their normal activities to measure flood risk and to consider strategies for reducing those risks, particular government agencies at different levels will consider different approaches to reducing harms or vulnerability (see Section 2.5). Their work should routinely involve measure and consultation with various stakeholders and familiarisation with (and promotion of) sustainable development planning in communities with flood risk. In their generation of strategies, they should also begin to formulate specific proposals. It is in these stages where there is a need for participation and accountability. It is also here that certain governmental bodies will begin to formulate specific projects and it is here where many different actors and interests may enter the process and where the public participation can become crucial as a check on the use of public and private funds.

Though a 'project proponent' may seek to identify the interests, problem definition, resources and mandate of different stakeholder groups, the stakeholder analysis uses a participatory process that involves the different stakeholders, themselves. For example, during a public consultation workshop to introduce and discuss a IFRM project, the proponent should organise Focal Groups during which different types of stakeholders work together to identify their interests, how they define the problems to be addressed by the project, and, where relevant, their mandate. In a plenary session, the different Focal Groups can share the results of their work and a comprehensive stakeholder analysis can be prepared and agreed upon. Throughout this process, the proponent should also establish a basis for periodic updating of the analysis in consultation with the different stakeholder groups. The size of each Focal Group will have an impact on the participation and should be carefully considered.

Identification of public stakeholders (the 'primary stakeholders') should also include an analysis of their rights and interests within the framework of international legal protections (for communities, ethnic groups and individual characteristics). For institutional stakeholders, sometimes referred to as the 'secondary stakeholders' (government bureaucracies, contractors, and investors), the purpose of the analysis is to understand their financial and bureaucratic interests in order to make sure that their interests do not interfere with protection of the interests of communities and beneficiaries.

In preparing the stakeholders' analysis to protect communities and to understand the organisational interests that may interfere with the interests of beneficiaries, there are key questions to ask about goals as well as some general administrative questions, as follows.

Key questions for stakeholders' analysis:

1. How will the structural flood protection measure impact positively or negatively the people in the demonstration project focal area?
2. What are the capacities of the people to adapt to the changes in land-use patterns?
3. What support systems would be necessary to help people adapt to changes or to apply new measures to reduce their vulnerability?

Questions to ask:

1. Who is likely to benefit from the project?
2. Who is likely to be affected by the negative impacts of the project?
3. Who will be responsible for implementing measures to mitigate the negative impacts?
4. Whose cooperation, expertise or influence would be helpful to the success of the project?
5. Who are the most vulnerable and least visible for whom special efforts have to be made?
6. Who supports or opposes the changes the project will bring?
7. What factors could be detrimental to the success of the project?
8. Who might have resources to contribute?
9. Who is able to make decisions (land-use, access, construction designs) that could affect the project?

Those who currently do stakeholder analyses tend to oversimplify the concerns of others relative to themselves; believing that interests, experiences, needs and expectations are homogenous among a given group of people. In reality, stakeholders are very diverse, and methods used in stakeholder identification and analysis must accept and reveal this complexity, by describing and interpreting the many differences which exist among ethnic groups, social groups and peoples, while also being honest about institutional biases and conflicts of interest. Stakeholders must also be defined broadly, in order to reflect the widest possible range of communities and individuals. The interests or stakes of various actors or stakeholders differ not only as a result of ethnicity and social roles but also as a result of factors such as tenure, ownership, history of use, social status and associations, individual values and perceptions, and pattern or type of use.

The stakeholder analysis matrix (appendix 2) should be completed with people knowledgeable about the project area.

Once stakeholders are identified, it is important to understand that group dynamics also has an impact on the quality of information and interaction in the process. Where a number of different stakeholders are invited to a meeting, one can expect psychological factors to play a role as shown below.

How the size of meetings impacts participation:

3–6 people:	Everyone speaks.
7–10 people:	Almost everyone speaks. Quieter people speak less. One or two people may not speak at all.
11–18 people:	Five or six people do most of the speaking, 3 or four join in occasionally.
19–30 people:	Three or four people dominate. To overcome this problem, breakout groups of 4 to 8 people are needed if issues are to be discussed in any depth.
30+ people:	Little participation in a discussion is possible unless breakout groups are used.

Mixing men and women and people of different status or backgrounds may be useful in meetings designed to elicit and incorporate a variety of perspectives and experiences. However, this may not be possible or appropriate everywhere. Group organisers should be sensitive to power relationships and cultural norms. In meetings designed to seek in-depth perspectives from each group, it is sometimes better to separate groups into homogeneous subgroups.

Source: Rogers, J. 1989. Adults Learning. Open University Press. Milton Keynes. UK.

Once stakeholders are appropriately identified following the principles above, the interaction of the different kinds of stakeholders also needs to follow a logical process that fits the context. Below are some of the detail explanations of the issues and questions presented above in outline of the process:

Who are the principal (primary) and secondary stakeholders?

In general, the principal or primary stakeholders are the people, ethnic groups and communities and categories of people (for example by age, gender, profession, health) that are (i) the intended beneficiaries from the reduced flood risk; or alternatively, (ii) the people or groups that are most at risk of being adversely affected by the IFRM measures. The secondary stakeholders are the institutions -- public, private and community organisations -- that are directly responsible for and/or instrumental to the planning, construction or operation and maintenance of the FRM measures. Some groups may be both primary and secondary stakeholders – they may be beneficiaries who have a mandate or other resources to contribute to the planning and implementation of the project.

What are the stakeholders' interests?

The primary and secondary stakeholders have different types of interests. For primary stakeholders -- people and communities in the project area -- the interest is to reduce the damages to their land, property and other assets. For rice farmers, the interest may be more specific to protect their wet-season rice crop. According to international treaties and international law, the interests are the sustainability of each cultural-ethnic group within their resources, to promote the overall sustainability of the planet and the goals of global security. For secondary stakeholders, like a national disaster management agency, their interests may be how the project contributes to the objectives of a regional flood risk management plan and their bureaucratic interests in managing such a project. The provincial department of agriculture, on the other hand, may be focused on increasing short-term crop production and/or diversity with projects under its control. Environmental NGOs are interested in issues such as protection of environmental flows, biodiversity, etc. as well as their institutional interests in managing 'projects'.

How do stakeholders define the problem(s) that need to be addressed by the FRM measures?
The problem definition by different stakeholders should be stated as clearly as possible and should be a negative statement describing a hazard or vulnerability, not a statement that already implies a solution. For communities, for example, the overall definition of hazard and vulnerability may be: 'Our future is endangered since there is no sustainable development plan to assure the long-term survival of our community on our traditional lands and in keeping with our resources, or ensuring the per capita value of our natural assets.' For farmers 'wet season rice paddy is at risk of inundation if floods occur early or are deeper than normal' (rather than, "there is no flood protection system"). The problem for farmers may also be that 'deep floods increase the risk of injury or death for livestock.'

What are the resources that secondary stakeholders can bring or need for achieving the project objectives or that they bring to oppose them?
Different stakeholders will have different resources that they can mobilise either to support or, in some cases, to oppose the interests of the primary stakeholders. Resources are financial and non-financial. Many government agencies and formal organisations have both types of resources; in addition to money, they have knowledge/technical expertise, political influence and other types of non-financial resources. The people living and working in the project and most civil society organisations, however, have predominantly non-financial resources, for example, volunteer labour, time, local knowledge, votes, strikes and public pressure. In a process that is designed to protect the primary stakeholders as the essential interest, the political realities are often that the secondary stakeholders bring resources that they can use to manipulate the process. In other cases, where they can be helpful, they may lack resources.

What are the mandates of the secondary (institutional) stakeholders?
A stakeholder's mandate is the formal authority to carry out a particular function. For example, local government may be mandated to provide certain types of services for people living in the project area and to build and/or maintain local infrastructure. Other government agencies at all levels may have formal mandates, as do many civil society and other non-governmental organisations, international and private organisations.

3.11.2 Information dissemination

Information dissemination can take a variety of forms throughout the project planning cycle and should be understandable and useful to the stakeholders.

All of the institutional stakeholders should be open and transparent in dealings with the public, starting at the very early stages of planning and at the same time that experts are conducting a social assessment. The two-way flow of information between primary and secondary stakeholders is essential for promoting an active relationship between institutions and the public.

During the planning phase it is important that members of the public clearly understand the stage of the project and the decision-making processes of institutional stakeholders. In some cases, where projects may be open for public bidding on contracts, some aspects of confidentiality are important to prevent conflicts of interest (including land speculation).

In the IFRM planning stage the following public information is essential:

- What project or initiative is being planned, and what is the potential financing source (along with potential obligations and controls)?
- Why is information being gathered, who will use it and how?
- What are the results of the different assessments, how were they prepared and how can they be challenged by primary stakeholders?
- Is the project proceeding or not and what are the reasons in either case?
- What are the next steps?

3.11.3 Information gathering: the social impact assessment

The next stage of public involvement is to examine how stakeholders are affected by a particular project or programme by understanding of their social, economic, cultural and political conditions in a professional framework. This stage is also referred to as the social impact assessment. The process for social impact assessment gathers information from the community using participatory techniques. The purpose and methods are described in detail in Chapter 5: Practices for social.

Note that while projects will have specific "social impact assessments" conducted by professionals as a protective check of the impacts on vulnerable populations and individuals, the purpose of FRM is always to have a beneficial social impact. FRM interventions should always be part of a larger context of sustainable community planning for ethnic groups and communities in which the mandates of institutional stakeholders should always be connected to some kind of positive social impact that promotes sustainable communities.

3.11.4 Consultation and participation in decision-making at all stages of the planning process

In the consultation process, ideas and priorities from primary (and secondary) stakeholders can already start to affect strategy and project design. Where formal processes are used (beyond routine government and NGO surveys, media reporting, and political activities) inputs from participants are documented by project planners who then assess whether the expressed needs and preferences can be included in their strategy and design, and if so in what ways.

Where primary stakeholders are able to take part in decision making, the public reviews and can make procedural challenges to projects, policies and everyday resource decisions as well as influence activities, costs and benefits. In the LMB, participation in decision-making is often routine on small-scale damage mitigation works or non-structural measures at the level of villages or community-based organisations.

The forums and methods for consultation and participatory decision-making are similar (or one and the same), depending on authorities managing them. In both cases, participants need technical information made accessible to the lay person on flood risks and scenarios for flood protection in order to provide quality input or make informed decisions.

In the IFRM planning stage the following public inputs are required as part of effective decision-making:

Table 3-3 Input requirements in public decision-making in the IFRM planning stage.

Inputs from stakeholders	Potential Methods of collecting or organising data
Perspectives on the main problems to be addressed by flood risk mitigation measures within the context of sustainable communities.	Participatory vulnerability assessment Participatory rural appraisal. Community sustainability plan (balancing population and consumption with productivity and resources for two generations).
Prioritisation of potential solutions to reducing flood risks.	Open municipal/village/commune meetings.
Validation of: - the choices of flood protection measures considered as options for reducing hazards and/or vulnerability. - the locations/settlement areas/land that will benefit from flood protection investments.	Focal Group discussions with representative groups.
Issues, opportunities and constraints (to feed into the environmental, social and economic assessments).	Key informant interviews with leaders of villages, community-based organisations or other representatives to gain a perspective of elite ideologies.

Appendix 3 offers a very short and simplified sample of introductory questions that can be asked of stakeholders during consultations in a specific area such as farming. Answers to questions like these in the full scope of areas of potential impacts on daily life and community can help in validating the choice of flood protection measures, their location or can help in searching for alternative solutions when problems are identified. Note, however, that these questions should be prepared professionally with sociologists or anthropologists to make sure that they do not unintentionally bias discussions or reinforce certain interests of those who prepare them.

3.12 Using the findings of the stakeholders' analysis

Findings from a stakeholder analysis are recorded in the tables and matrix diagrams, and the risks and assumptions arising from the analysis should be included in the project's logical framework. In addition, the analysis should have contributed to a participation matrix that is used to explain project design. These records of the analysis are the basis for revision later on in the life of the project.

In more concrete terms, the findings of a stakeholder analysis need to be included (with different amounts of detail) into (a) the project concept note and (b) the project document. It will also be appropriate to include analysis in annual monitoring reports and reviews.

Findings should be shared with community members, with an emphasis on being sensitive and respectful to race, ethnicity, gender, language, and culture.

3.13 Public participation checklist for government agencies

The following advice is offered to government bureaucracies that have authority to conduct public participation processes in their consideration of public investments.

1. Review the public participation policies at MRC and respective NMCs and also of the line agencies, if they exist, as well as international principles on rights and protections and begin steps to assure they are adhered to.

2. Obtain the support of senior management to ensure that the agency's policies and activities are modified to ensure early, effective and meaningful public participation, especially with regard to FMM stakeholders.

3. Use the following Guiding Principles in setting up all public meetings:
   - Maintain honesty and integrity throughout the process and seek to eliminate the agency's own conflicts of interests that can prejudice primary stakeholders.
   - Recognise community and local knowledge and right to sustainability under international legal obligations and assure that community sustainable development planning (balance of population and consumption with resources for at least two generations) is already part of the governance process and context.
   - Encourage active community participation.
   - Utilise cross-cultural formats and exchanges.

4. Identify primary stakeholders and provide opportunities to offer input into decisions that may impact their lives. Consider at a minimum individuals from the following as appropriate:
   - Affected communities (geographic and ethnic);
   - Civic/public interest groups; and
   - Grassroots/community-based organisations.

   Line agencies serving affected communities may also be considered for inputs, recognising that they are secondary stakeholders.

5. Identify key individuals who may be able to represent various stakeholder interests. Learn as much as possible about stakeholders and their concerns through personal consultation, phone or written contacts. Ensure that information-gathering techniques include culturally sensitive communications with minority and vulnerable communities (for example, consider language and cultural barriers, technical background, literacy, access to respondents, and preferred types of communications).

6. Solicit stakeholder involvement early in the policy-making process, beginning in the planning and development stages and continuing through implementation and oversight.

7. Develop co-sponsoring/co-planning relationships with community organisations, providing resources for their needs and seeking to establish financially and politically accountable systems.

8. Establish a central point of contact within the NMC to assist in information dissemination, resolve problems and to serve as a visible and accessible advocate of the public's right to know about issues that affect the sustainability of their cultures and communities, their lives, or their environments.

9. Regionalise materials to ensure cultural sensitivity and relevance. Make information readily accessible and understandable. Executive summaries/fact sheets should be prepared in layperson's language. Translate targeted documents into local languages.

10. Make information available in a timely manner. FMM stakeholders should be viewed as full partners and as the 'owners' of the agencies, with public officials as their servants. This is the meaning of 'agency'; acting on behalf of public owners and under their control.

11. Ensure that personnel at all levels in the agency clearly understand policies for transmitting information to FMM stakeholders in a timely, accessible and understandable fashion and can be held accountable for doing so.

12. Schedule meetings and/or public hearings to make them accessible and user-friendly for FMMP stakeholders. Consider time frames that do not conflict with work schedules, 'rush hours' (e.g., picking up children from school), dinner hours and other community commitments that may decrease attendance. Consider locations and facilities that are local, convenient and are considered public space.

13. Consider other communications outreach to increase participation of stakeholders including:
    - Posters and Exhibits;
    - Announcements presented in Civic and Community Activities;
    - Public Database and Bulletin Boards;
    - Surveys; and
    - Training and Education Programs, Workshops and Materials.

14. Educate stakeholders about all aspects of flood risk reduction.

CHAPTER 4

PRACTICES FOR ENVIRONMENTAL IMPACT ASSESSMENT

4 PRACTICES FOR ENVIRONMENTAL EVALUATION

4.1 General environmental impact assessment approach

Seasonal flooding is an annually recurring phenomenon in the Lower Mekong Basin (LMB). It is vital to maintaining the inland fishery and agricultural production in the basin and provides a variety of flood related ecosystem services. At the same time, annual floods inflict damages on households, agriculture and infrastructure and result in loss of life and property. With growing population and construction, the needs for protection of peoples and their socio-economic activities against flooding has increased and a variety of flood management and mitigation projects are widely implemented.

Structural flood management measures, such as the construction of dams and reservoirs, embankments, and bypass channels can have serious environmental and socio-economic impacts. They alter the natural environment of rivers, resulting in loss of species habitats, biological diversity and ecosystem productivity. These impacts may affect people both upstream and downstream, at the local as well as the regional (transboundary) level.

This chapter looks specifically at the environment and at means of assessing the impact on the environment of FRM approaches. In referring to the environment here, the 'environment' is recognized as the totality of the natural and human environments (often called the biophysical and socio-economic environments). It includes:

> (a) all biophysical components of the natural environment of land, water and air, biological resources, and inorganic and organic matter both living and dead; and
> (b) all socio-economic components of the human environment including, but not limited to, social, economic development, human resources, quality of life, administrative, cultural, historical, archaeological, architectural, structures, sites and things, land and resource usage, and human health, nutrition and safety.

Environmental Impact Assessment (EIA) is a tool that helps environmental managers to identify, predict and mitigate potential environmental impacts of proposed plans or projects. It supports decision making on whether or not a project should be implemented and, if so, in what form.

For a more effective environmental assessment, it is important to start at the strategic level with what is called a Strategic Environmental Assessment (SEA) that takes into account social factors as well as environmental, and to facilitate a dialogue between environmental and other authorities, as well as with informed public representatives. Stakeholder involvement (see Chapter 3) is crucial in identifying, assessing, monitoring and evaluating environmental impacts.

The MRC (in its Environment Training Kit, 2005) has summarised the purposes, objectives and benefits of EIA in the following outline form:

Purposes

- Ensure the wise use of natural resources;
- Assist in pursuing wise development by evaluating alternatives, improving proposal design and enhancing social aspects of the project;
- Evaluate the rationale behind the proposed development;
- Identify measures for eliminating or reducing potential impacts; and
- Enable informed decision making.

Objectives

- Ensure that potential environmental effects are considered before decisions are made;

- Promote sustainable development;
- Contain adverse environmental effects within known, specific boundaries; and
- Provide opportunity for public involvement in the decision-making process.

Benefits
- Promotes better planning and leads to more responsible decision-making;
- Increases likelihood of public acceptance of controversial projects; and
- Saves time and money in the long run: reduces approval time and the need for corrective action.

4.2 Existing practices

All four countries in the region have passed legislation requiring environmental impact assessments.

Cambodia

Cambodia introduced environmental impact assessments in legislation in 1995. However, 14 years later actual experience using such assessments to protect the environment is still limited. The Cambodian government has been slow to develop, screen, and review EIA reports.

EIA requirements were first presented in Sub-decree on the Environmental Impact Assessment Process No 72 ANRK.BK dated August 11, 1999. Nevertheless, it took five years, until 2004 before the sub degree was first enforced. The annex to the sub-decree provides a list of projects requiring an Initial Environmental Examination (IEE) or EIA. The projects are categorised as: a) industrial sector; b) agricultural sector; c) tourism sector; and d) infrastructure projects. Retention reservoirs, river improvement works, dykes and diversions are not mentioned specifically, but fall in either the industry, agricultural or infrastructure categories, depending on the nature of the project.

In 2000, Cambodia drafted general guidelines for conducting Environmental Impact Assessments with the support of the Asian Development Bank (ADB). A number of sectoral guidelines are available in draft but still require further refinement before the government will endorse them. Specific guidelines for flood protection projects are not available. Of all of the available guidelines, those for irrigation project and riverbank protection projects have some relevance to flood protection project EIAs.

Lao PDR

EIA regulation in LAO PDR dates back to 2000 (in the Regulation on Environment Assessment of the Lao PDR, Decree No. 1770). The decree provides guidelines and standards for environmental assessments and offers a framework within which other ministries can develop their own sets of standards and guidelines for EIA procedures. The decree stipulates that 'no construction or other physical activities shall be undertaken at a project site until an environmental compliance certificate for the project has been issued. Types or sizes of projects which do or do not require an EIA have yet to be specified. Under current practice, the 'Development Project's Responsible Authority' has the power to review projects (based on their description) on a case by case basis and to determine whether an EIA is required.

Development of sectoral guidelines is the responsibility of the sector ministries themselves. To date, specific guidelines exist only for hydropower projects, road construction projects and mining projects. Recently, the Water Resources and Environment Authority (WREA) was designated as the responsible authority for the drafting of guidelines. However, the drafting of a specific guideline for flood protection works is not yet on the horizon.

Viet Nam

EIA was first mentioned in Viet Nam's Law on Environmental Protection (Article 18) in 1994. Following the law, the Ministry of Science, Technology and Environment (MoSTE) has issued a number of circulars, decrees, ordinances and decisions. These provide further detail and guidance for the implementation of EIA. Strategic Environmental Assessments (SEA) have also been legislated in Viet Nam, dating to 2006. Laws and regulations do not specifically mention flood protection projects as subject to EIA. However, a number of related projects are specifically mentioned as subject to EIA by law. Projects of national importance of all sizes; projects of all sizes that have potential direct negative impacts on water sources feeding river basins, coastal seas, or areas with protected ecology; hydro-electric projects (including of reservoirs with a capacity ≥1,000,000 m^3); exploitation or dredging of ≥ 50,000 m^3 of sand or gravel per annum in river-beds; exploitation of surface water (≥ 10,000 m^3 per 24 hours); construction of irrigation schemes covering an area ≥ 500 ha; and construction of sea dykes of all sizes are subject to EIA.

General guidelines on SEA, EIA and Environmental Protection are all available but sectoral guidelines are not.

Thailand

The first mandatory provisions for EIA in Thailand date back to 1981.The EIA System in Thailand was officially established under the Enhancement and Conservation of National Environmental Quality Act of 1992. The Ministry of Natural Resources and Environment is empowered to specify by notification the type and size of projects or activities requiring EIA. The Environmental Impact Evaluation Bureau of Office of Natural Resources and Environmental Policy and Planning (ONEP) have prepared guidelines on EIA: 'Environmental Impact Assessment in Thailand'. The most recent version as of the writing of this report, dates from July 2007.

The guidelines provide background information on EIA and recommendations for preparation of EIA reports. Types of projects or activities listed as requiring an EIA include: dam or reservoir construction with a storage volume ≥100,000,000 m^3 or a surface area ≥ 15 km^2 and irrigation projects with an irrigated area ≥ 12,800 Ha. Flood protection projects are not specifically mentioned.

Specific guidelines are available for a number of projects types such as Dam/Reservoir construction. There are also guidelines for conducting Socio-economic Impact Assessments, for promoting Public participation in EIA, and for conducting Health impact Assessments. The socio-economic and public participation guidelines are in line with those of the World Bank, with some 'adaptations' to Thailand.

Transboundary impacts are not addressed in the general EIA guidelines. The Thai government's point of view is that transboundary guidelines can only be applied voluntary (in the spirit of cooperation) and are not obligatory. Furthermore, transboundary issues are not considered necessary by the Thai government since there are very strict mitigation obligations in Thailand along with a Public Security Law states that does not permit projects at locations less than 1 to 2 km from the border.

Transboundary impacts

The MRC Member Countries recognise that environmental effects do not respect political boundaries, certainly not in river basins. The concept of sustainable development (a balance between population, consumption, production and resource base over at least two generations) has been rising on government agendas and there is an emerging attentiveness to preventing any harmful transboundary impacts in the basin.

This approach is also reflected in the Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin of 5 April 1995, though only in non-binding symbolic terms. Three of the articles are worth noting:

- Article 3 of the Agreement, on 'Protection of the Environment and Ecological Balance', asserts that the parties agree 'To protect the environment, natural resources, aquatic life and conditions, and ecological balance of the Mekong River Basin from pollution or other harmful effects resulting from any development plans and uses of water and related resources in the Basin'.
- Article 7, 'Prevention and Cessation of Harmful Effects', asserts that the parties agree to 'To make every effort to avoid, minimise and mitigate harmful effects that might occur to the environment, especially the water quantity and quality, the aquatic (eco-system) conditions, and ecological balance of the river system, from the development and use of the Mekong River Basin water resources or discharge of wastes and return flows. Where one or more States is notified with proper and valid evidence that it is causing substantial damage to one or more riparians from the use of and/or discharge to water of the Mekong River, that State or States shall cease immediately the alleged cause of harm until such cause of harm is determined in accordance with Article 8.

National environmental assessment legislation and procedures do not yet provide a framework for evaluation of transboundary impacts. Development of a common procedure could enhance cooperation and prevent disputes and the MRC is committed to developing such an approach.

The FMMP Component 3 "*Enhancing Cooperation in addressing transboundary flood issues*" has developed interesting material for addressing transboundary flood issues in the framework of the Mekong Agreement 1995 for which reference is made to the References.

The MRC has developed a draft version of a Framework for Transboundary Environmental Impact Assessment (TbEIA, March 2006) for the Lower Mekong Basin that mentions ports and river works as projects having potential transboundary impacts. The MRC considers flood protection dykes and dams as having the potential for negative transboundary impacts. Flood management projects other than dykes and dams and industrial water supply projects were originally on the list, as well, but have been removed, since flood management and industrial water supply are considered national issues.

4.3 Environmental impact assessment

4.3.1 Overall procedure

Environmental Impact Assessment (EIA) is a process in which a range of environmental, social, and economic issues are taken into account to determine whether environmental conditions should be placed on a project, or whether a project should be allowed to proceed at all.

The EIA process comprises a number of steps, from screening of the proposed project or activity to determine whether it should be subject to a complete assessment, to post evaluation of the process and the effectiveness of mitigation measures.

An EIA aims to improve projects but not to judge them. The professional judgment on policies, plans or programmes on their broad socio-economic and environmental impacts requires conduct of a Strategic Environmental Assessment (SEA) (see Section 4.6).

The process includes several different steps and is to be conducted by experts.

Project screening is the initial process undertaken to determine whether a project requires an EIA and, if so, what level of environmental review is needed (see Section 4.3.2). Not all proposed projects require a full EIA since some projects may not pose an environmental threat. Screening answers the initial question of whether or not an EIA needs to be performed.

Once it is decided that an actual impact assessment is required, the EIA starts with collection and analysis of basic data on the project (including possible project alternatives) and the environmental impact. The collection and analysis of the environmental data creates a 'baseline' (see Sections 4.3.3 and 4.3.4).

In defining the baseline conditions, the environmental effects of 'autonomous developments' (trends) are taken into account.

Potential impacts are identified based on the information on baseline conditions and sources of impact (see Section 4.3.5). This identification involves an estimate of the order of magnitude of the impacts. Usually, only a few of the potential impacts are studied in detail. The selection of those impacts to be studied in detail relies on criteria such as:

- Magnitude (the amount of change) of impact;
- Extent of impact (the affected area); and
- Significance of the impact (with respect to effects).

The process of selecting relevant alternatives and identification of the important (significant) impacts is commonly known as 'scoping' (see Section 4.3.6). Scoping is a very important step in the environmental impact assessment procedure and should be open and accessible so as to enable all interested parties (stakeholders) to express their concerns. A goal of the scoping phase is to assure that all alternatives and impacts relevant to any of the interested parties are taken into consideration. This increases the comprehensiveness of the assessment.

Scoping concludes the pre-study phase, after which the actual study period with the preparation of the Environmental Impact Statement (EIS) begins. In this phase an assessment is made of the selected alternatives and impacts (see Section 4.3.7). Furthermore measures to mitigate undesired, adverse impacts are proposed. In the post-study period the EIS is reviewed, the actual decision is made and the impacts are monitored.

The general outline of an environmental impact assessment is illustrated inFigure 4-1, and shows the conceptual framework for EIA studies. An EIA consists mainly of the following components, described here and then with some additional detail in the sections that follow in this chapter:

- A description of the proposed project and its objectives. Both (component) activities and sources of impact are described and analysed, for the construction phase (which has its own impacts) as well as the operational phase of the project.

- A description in ecological and socio-economic terms of the existing situation in the area directly affected by the project and of the natural resource use. The description of the existing environment should focus on those elements which are essential to a description of the environmental impacts.

- A description of the autonomous developments (trends) in the area, in as far as these developments may be of importance. Examples of autonomous developments are changes in population density and related changes in water quality.

- Identification of the potential impacts and definition of the scope of the assessment, including agreement on geographic boundaries, selection of methods for evaluation and presentation, etc. Identification of the relationships between the proposed project and other existing plans and policies is also important for establishing the context. Furthermore, it is important to review the existing legislation to determine whether it is sufficient to offer real protections that are enforceable or whether it is simply a list of intentions on paper. Where legal protections are not sufficient to guarantee proper execution of the project activities and for the impacts as a result of the project, it will be critical to start with changes in the laws and/or the legal and political realities behind those laws.

- A description of the relevant project alternatives. This may include alternative solutions as well as alternative methods for achieving the project objectives.

- Design of the research. This includes selection of impacts to be studied, selection of the forecasting methods that will be applied and agreement on the level of detail of the study.

- Forecasting of potential impacts (see Section 4.3.8). Not only should impacts as a direct result of the project be considered, but so should impacts resulting from developments which are induced by the project. The irreversible and irretrievable use of natural resources is usually also estimated. Generally, a distinction can be made between positive and negative impacts, reversible and irreversible impacts and short-term and long-term impacts. Distinctions should also be made between impacts occurring during the construction phase of the project and those occurring after completion (during the operational phase).

- A list of mitigating measures in case adverse impacts are identified (see Section 4.3.10). These measures can also be directed at impacts that may result outside the direct project area. The effectiveness of such measures in reducing negative impacts should be described, as well as their feasibility and their costs and benefits.

- Assessment of the impacts. Assessment includes a comparison of the various project alternatives and mitigating measures with the situation without the project but including autonomous developments. (See Section 4.3.9.) Impacts are evaluated by comparing the forecasts with existing national and international environmental standards and criteria. The comparisons highlight which alternative and which mitigation measures are preferable from an environmental point of view, and

- Recommendations for a monitoring program to check the impacts and to take remedial measures if negative impacts are worse than anticipated. (See Section 4.3.12.) The program should include a procedure to be followed if impacts prove to be more severe than anticipated. Questions to be answered include: "Who is responsible for the monitoring?" and "On what time scale should monitoring be carried out?" It is also common in EIA studies to present an overview of identified gaps in knowledge and information and to show how these gaps influence the decision-making process. Gaps in knowledge may be addressed in the monitoring program. If additional information is essential to decision-making, further measurements or studies should be considered as part of the environmental impact assessment.

The above procedure for a complete environmental assessment is time consuming and costly. It may not always be necessary. During a first screening of a proposed project, an assessment should be made of whether or not serious adverse impacts of project activities on the environment are expected, and whether or not a full scale EIA needs to be conducted.

Following the EIA, there are then several other steps, starting with management, described in Section 4.3.11 and other sections that follow from reporting in 4.3.13.

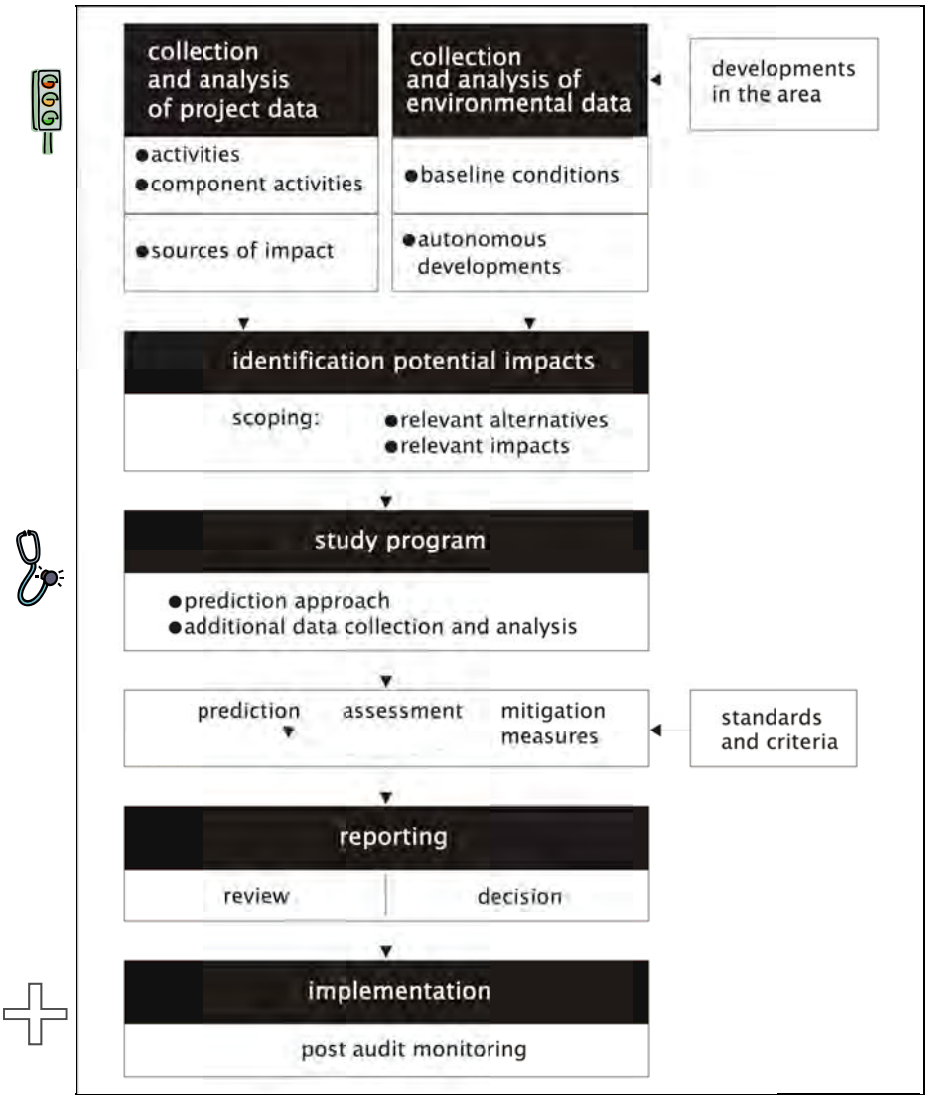


Figure 4-1 Conceptual framework for EIA studies.

4.3.2 Screening

Screening is a procedure used to determine the environmental assessment requirements for a proposed project. Screening is generally straightforward though the standards are not necessarily those that environmentalists or anthropologists would consider best practices and the outcomes depend on the quality and professionalism of the screening beyond just the listed criteria. Most EIA legislation includes at least a detailed list of project types and the appropriate level of environmental review. In the absence of such a list, other criteria can be used. For example, the Asian Development Bank (ADB), (2002) offers its criteria from the perspective of an investor for projects requiring a full-scale EIA and there may be sets of criteria and detailed procedures that environmentalists recommend to ensure professionalism beyond just a cursory check.

Based on its experience as an investor, the Asian Development Bank developed Rapid Environmental Assessment (REA) checklists. These checklists seek to quickly assess the:

- sensitivity and vulnerability of environmental resources in the project area; and
- potential for significant adverse environmental impacts, taking into account the type, size, and location of the proposed project.

Projects are categorised as either having:

- potential for significant adverse environmental impacts;
- some adverse environmental impacts, but of lesser degree and/or significance than projects under the first bullet; or
- unlikely adverse environmental impacts.

Projects placed in the first category are eligible for an environmental impact assessment (EIA) to address significant impacts. Projects in the second category are subject to an initial environmental examination (IEE) to determine whether or not significant environmental impacts warrant an EIA. If an EIA is not supported, the IEE is regarded as the final environmental assessment. For projects in the third category no EIA or IEE is offered, although environmental implications are still reviewed.

The REA suggests that categorisation be based on the most environmentally sensitive component. This means that if one part of the project has potential for significant adverse environmental impacts, then the project is to be classified in the first category, regardless of the potential environmental impact of other aspects of the project.

A proposed project is classified in the first category if it is likely to have significant adverse environmental impacts that are 'sensitive, diverse, or unprecedented', and affect an area broader than the sites or facilities subject to physical works. The following locations for proposed projects suggest such a classification:

- In or near sensitive and valuable ecosystems (e.g., protected areas, wetlands, wilderness lands, coral reefs, and habitats of endangered species);
- In or near areas with cultural heritage sites (e.g., archaeological, historical sites or existing cultural sites);
- Densely populated areas where resettlement may be required or pollution impacts and other disturbances may be significant;
- Regions subject to heavy development activities or where there are conflicts in natural resource allocation;
- Watercourses, aquifer recharge areas, or reservoir catchments used for potable water supplies; and
- Lands or waters containing valuable resources (e.g., fisheries, minerals, medicinal plants, prime agricultural soils).

A full scale EIA is also recommended if the project is likely to lead to one of the following impacts:

- Permanent transformation of potentially productive or valuable resources (e.g., fisheries, natural forests, wilderness lands);
- Destruction of natural habitat and loss of biodiversity or environmental services provided by a natural system;
- Risk to human health and safety (e.g., from the generation, storage, or disposal of hazardous wastes, inappropriate occupational health and safety measures, or violation of ambient water or air quality standards);
- Encroachment on lands or rights of indigenous peoples or other vulnerable minorities;
- Displacement of large numbers of people or businesses; and
- Ineffective mitigation or weak and/or unenforceable compensation measures.

A project is classified in the second category if its potential adverse environmental impacts on human populations or environmentally important areas, (e.g., wetlands, forests, grasslands, and other natural habitats) are less adverse than those of projects in the first category. The impacts

are more site-specific, and few are irreversible in this category. In most cases, mitigation measures can be designed more readily than for projects in the first category.

A project is classified in the third category if it is likely to have minimal or no adverse environmental impacts. Appendix 5 offers a screening checklist summarising the criteria that can be used for project categorisation.

4.3.3 Description of the project

The description of the project should pay attention to the basic activities related to the project, the project location and the project layout and implementation schedule (in terms of the project cycle). Information, in sufficient detail, should be provided on the:

- type of project;
- need and justification for the project in the context of sustainable development planning of each ethnic group and community affected;
- project location (maps showing general location, specific location, project boundary and project site layout);
- size or magnitude of the operation including any associated activities required by or for the project; and
- design of the project including drawings showing project layout, components of the project, etc.

This information provides a clear picture of the project and its operations. The proposed schedule for approval and implementation should be described as well.

4.3.4 Description of the environment

To be useful, the description of the environment should provide a clear picture of the existing environmental, economic, social and cultural resources and values within the project area. Data sources should be described briefly and the use of maps, figures, and tables to illustrate the baseline conditions is important as supporting documentation. The baseline information of the project area should include a description of four elements of the area:

1. physical resources, such as:
   a. atmosphere (e.g., air quality and climate);
   b. topography and soils;
   c. surface water, including flood characteristics;
   d. groundwater; and
   e. geology/seismology.

2. ecology, such as:
   a. fisheries;
   b. aquatic biology;
   c. wildlife;
   d. forests;
   e. wetlands;
   f. rare or endangered species; and
   g. protected areas.

3. economic activity in the area, such as:
   a. industrial activities (e.g., micro-enterprise and home-based industry, small and medium enterprises and larger industrial activities);

b. infrastructure facilities (e.g., water supply, sanitation, drainage, irrigation, and flood control structures);
c. transportation (e.g., roads and bridges, airports, ports, inland waterways and other navigation channels);
d. land uses (e.g., residential, agricultural, commercial) and ownership (e.g., registered title or other legal rights, lease, customary rights, etc.);
e. power sources and transmission (e.g., hydropower, thermal);
f. agricultural and fishery activities (e.g., rice cultivation, subsistence agriculture, commercial/cash cropping, tree plantations, animal husbandry, etc.);
g. mining activities; and
h. tourism facilities and potential.

4. social and cultural conditions, such as:
   a. population and communities (e.g., numbers, locations, composition);
   b. health facilities;
   c. educational facilities;
   d. socio-economic conditions (e.g., ethnic groups, community structure, family structure, health and educational status, employment, social well-being);
   e. current use of lands and resources for traditional purposes by indigenous peoples; and
   f. cultural heritage and structures or sites that are of historical, archaeological, paleontological, or architectural significance; and
   g. Traditional flood coping mechanisms.

4.3.5 Identification of potential impacts

Potential impacts are identified based on comparison with baseline conditions on the environment. This identification involves an estimate of the order of magnitude of the impacts. Criteria are used such as:

- Magnitude (the quantum of change) of impact;
- Extent of impact (the affected area); and
- Significance of the impact (with respect to effects).

Usually only a few of the potential impacts are studied in detail. The process of narrowing-down the identified potential environmental impacts to ensure that the assessment focuses on the key issues for decision-making is known as scoping.

In the development of flood risk management plans, programs or measures, four of the project phases can have a bearing on specific environmental and socio-economic impacts. They are:

1. site selection;
2. concept, planning and design;
3. implementation, including construction; and
4. management, operation and maintenance.

The following section presents an overview of potential (first order) environmental and socio-economic impacts or concerns for each of these project phases.

Potential impacts related to site selection:

Site selection can have adverse environmental impacts due to changes in the environmental characteristics of the site or area, impacts on livelihood, and the possible need to resettle people away from their current residences. Inappropriate project concept, planning or design may result in undesirable environmental impacts due to changes in the hydraulic characteristics,

including the flooding regime, of the site or area; environmental impacts on land, water, and air quality; and changes in the socio-economic viability of the ethnic groups and communities currently in the project site or area.

1. Land acquisition. Land required by the project may cause the permanent or temporary loss of agricultural and other types of current land uses; loss of or damage to crops, trees, structures and other assets on affected land; or, loss of or restricted access to common property resources (forests, grazing land, etc.). Land acquisition may also result in the displacement of households, businesses or other economic or institutional activities;
2. Encroachment on historical monuments and cultural values such as pagodas, temples, sacred sites (e.g., sacred forests) and graves. Special attention should be given to the effect of the project on indigenous peoples whose loss of culture may constitute a crime under international law (the genocide convention);
3. Encroachment into forests, swamps, loss of precious ecology. The selected site may contain rare/endangered or useful species/habitats of fauna and flora;
4. Loss of agricultural, aquaculture or grazing land;
5. Impediments to the natural migrations and movement of wildlife, cattle and people, including obstruction to navigation and obstruction of fish migration paths; and
6. Loss of the aesthetic, visual or recreational amenity or value of the area.

Potential impacts related to project implementation and construction activities:

Project implementation, including construction, can have undesirable environmental impacts due to temporary and permanent changes in the land, water, and air quality, and charges in the socio-economic characteristics both during and after construction.

1. Soil erosion. Unprotected soil during construction may erode and affect water quality downstream;
2. Increased turbidity in rivers and water courses due to construction activities or dredging in flowing water may lead to loss of flora and fauna;
3. Sedimentation of rivers and water courses as a result of increased sediment loads;
4. Loss of habitats/productive land by disposal of dredge spoil or solid waste/soil disposal;
5. Loss of soil fertility, e.g., when inappropriate landfill materials are used and productive top-soil is not re-used;
6. Worker accidents;
7. Accidents from increased traffic (construction equipment);
8. Disruption of access to villages, damage of local roads with heavy machinery;
9. Temporary obstruction to navigation;
10. Disruption of utility services;
11. Noise/vibration/air pollution (including dust) from construction activities;
12. Soil/water contamination as a result of leakage and inappropriate storage of fuels and other chemicals, dumping of construction wastes or improper sanitation (e.g., in worker camps);
13. Pollution of groundwater as a result of dumping of construction waste, inadequate storage and handling of fuels and other hazardous materials or improper sanitation (e.g., in worker camps);
14. Social/community disruption. Inflow of non-local workers in local communities/ establishment of work camps and differences in customs between local population and work force may lead to tensions;
15. Health impacts. Disease hazards to workers and local residents from lack of sanitation, poor water supply, improper waste management and import of carriers of communicable diseases such as HIV, malaria and dengue fever;
16. Increased pressure on water supply and sanitation facilities. Inflow of workers may put pressure on available resources;
17. Undesirable population in-migration to the project areas; and

18. Employment opportunities for residents, including local businesses.

Potential negative impacts related to project design, management, operation and maintenance

In the final phase, project management, operation and maintenance, undesirable environmental impacts due to changes in land, water and air quality; and due to changes in socioeconomic conditions in the medium and long term may occur. Note that impacts related to project concept, planning and design commonly have an overlap with impacts related to either project implementation or construction activities or with project management, operation or maintenance. There are also some positive impacts, presented further below.

The negative impacts are generally the result of project induced changes in the area's hydrology/hydraulics: i.e., the timing, extent, depth and duration of flooding, which may result in a loss of flooding related benefits, such as:

1. Loss of agricultural productivity. Reduced flooding will lead to reduced soil fertility (and consequent impacts on agricultural productivity) in areas previously inundated, the results may be reduced water availability, reduced leaching of acids and other pollutants and an increase in pests;
2. Losses in fishing. Changes in timing, extent, depth and duration of flooding lead to reductions in natural fish stocks due to loss of spawning, breeding, nursing or feeding grounds. Fish migration may be hampered;
3. Loss of wetland areas/productivity. Reduced flooding will lead to a reduction in wetland areas and related wetland productivity, biodiversity, natural water purification capacity and natural flow regulation capacity;
4. Reduced possibilities for navigation/transportation by boat;
5. Change in water availability in the dry season. Less replenishment of groundwater in the flood season may result in water shortages in the dry season;
6. Changes in river morphology, either sedimentation or scouring of certain river stretches may occur;
7. Changes in salt water intrusion; and
8. Changes in delta growth from accumulations of sediment.

The positive impacts related to project design, management and operation and maintenance are:

1. Increased safety for population living in the flood prone areas;
2. Reduced sanitation and public health problems in the flood season;
3. Decrease in flood damages to crops, infrastructure and ecosystems;
4. Opportunities to increase agricultural production;
5. Improvement mobility/better road transportation networks; and
6. Short-term poverty reduction and improved short-term food security.

For easy use, these potential impacts are placed into a matrix that can be used to highlight concerns in a summary, in Appendix 4.

4.3.6 Scoping

Scoping is a crucial part of any impact assessment process and involves the narrowing-down of the identified potential environmental impacts to ensure that the assessment focuses on the key issues for decision-making. The overall objective of the scoping exercise is to identify which of the identified potential impacts are significant and should be studied in detail in the EIA. The output of scoping is the Terms of Reference (TOR) for the actual EIA study, which needs to clearly define both the spatial and temporal boundaries for the EIA.

Scoping also provides a key opportunity for public participation and engagement with different stakeholders to ensure their early involvement in the EIA process, and to make sure that different stakeholder needs and interests are addressed throughout the rest of the process. As such, scoping ensures that the environmental assessment is focused on relevant issues that have been agreed upon following inputs from all parties concerned.

The issues are first identified and then the data required for sound assessment is specified. Issues that are well understood with adequate information already available can also be set aside as not needing further research.

The following activities should be part of the scoping process:

- Review all available information on the purpose and the need for the proposed project, as well as identification of the potential impacts;
- Visits to the proposed project locations and any alternative sites; and
- Public meeting with representatives of all stakeholders of the project to agree on the scoping.

In preparation for the scoping meeting, it is advised developing a Public Consultation and Disclosure Plan to assure adherence to transparency and accountability. The plan should fully identify the stakeholders and plan for consultation, disclosure of information, and accountable procedures for handling of comments and concerns.

Representatives of the following groups should be invited to participate in the scoping meeting:

- Local governmental authorities;
- National governmental ministries with authority over the Project's area of operations;
- Relevant environmental regulatory authorities;
- Specific commercial entities that would be involved in the operation;
- Representatives of academic or scientific bodies with particular interests;
- Representatives of the potentially affected local population, including employees, local community organisations and groups who may be affected by the project (e.g., residents, local enterprises, social organisations); and
- Representatives of non-governmental organisations (NGOs).

An information package on the project (e.g., a 5-10 page document with a cover letter and accompanying drawings, maps, etc.) should be prepared in local languages as part of outreach to stakeholders. The main document should contain a *brief* description of the following items:

- The proposed project, the justification that its proponents have given for it as well as the data and context within sustainable development plans for local communities, and who the project proponents are;
- Alternatives to the proposed project;
- The existing environmental conditions or baseline (based on environmental investigations carried out to date), identifying where there are gaps in information and where further studies are needed;
- The identified potential environmental impacts that may arise during both the construction and operations phases of the proposed project;
- Information on how proposed monitoring of impacts might take place;
- Contents of the proposed environmental impact assessment; and
- Proposed public consultation and disclosure plans.

The cover letter should explain to the invited participants the purpose of the scoping meeting: to gain input for, and agreement upon, the type and amount of information to be included in the EIA. The information package should be distributed to scoping participants at least two to three week prior to the scoping meeting(s).

Scoping meetings should be scheduled for a few hours to a half-day, depending on the number of issues and potential concerns. Sometimes, it is helpful to separate meetings with technical experts from the general public meetings, which may be non-technical in nature. Local groups should be the ones to select convenient local venues and timing.

At the end of the meeting, a formal summary record should be agreed upon. This summary should include the final Terms of Reference for the EIA and an overview of changes to be made to the Public Consultation and Disclosure Plan.

4.3.7 Development of alternatives

The development and proper examination of alternatives is another key element in any EIA. If a proposed project is expected to cause serious losses or degradation of the environment, the EIA should study alternative ways to meet the objectives of the project, with fewer or less serious impacts. An initial approach in looking for alternatives is to investigate whether or not the objectives of the project can be met in a fundamentally different way (e.g., by implementing non-structural flood protection measures instead of structural measures.) Seeking alternative options is only possible in an early phase of the project.

Once the choice for a certain project has been made, several other project alternatives can also be generated, taking into consideration:

- Alternative locations;
- Alternatives related to the nature and extent of the project activities;
- Alternatives related to design, material use and process;
- Alternatives in control and financing of the project; and
- Alternatives in implementation schedule.

The presentation is advised of at least one 'no-project' alternative and at least one ‘most environmentally sound’ project alternative to assure that the focus remains on outcomes rather than on other factors that often distort project selection processes. The ‘no-project’ alternative offers a basic standard of comparison while the ‘most environmentally sound’ alternative offers an indication of the minimum impacts that could be attained.

4.3.8 Forecasting of the impacts

Predicting the extent and magnitude of impacts is considered the most difficult part of an impact assessment. Forecasting attempts to determine the relationships between causes and effects, but these relationships are often not well-understood. Furthermore, prediction relies on data and analysis from a variety of sources; physical, biological and socio-economic, requiring combination of expertise and theories from different professions and disciplines. The quality and availability of data often imposes an important constraint to the accuracy and reliability of predictions. In many cases, high quality data are simply not available or the choice of experts and the forecasts are distorted by political pressures. Where data is unavailable, other more qualitative techniques will need to be used.

In selecting a prediction method, the following criteria have to be applied:

- Which impacts have to be predicted?
- Which methods are available to predict a specific impact?
- Which level of accuracy/detail is needed?
- How much time is available for the study?
- What is the budget available for the study?
- Availability of data?
- Availability of expertise and facilities, and
- Acceptability of the applied method by the decision maker and the scientific community?

Normally, the scoping of the project provides information on the impacts to be studied and on the desired accuracy of the prediction results.

There are both experimental methods of prediction using empirical data and mathematical models:

- Experimental methods include:
  - illustrative models that diagram or depict what a situation will look like;
  - physical (scale) models of an eco-system or physical system;
  - laboratory experiments to examine causal relationships without measuring them; and
  - field experiments.
- Mathematical models include:
  - empirical models that are able to test and measure causal relationships or offer statistical data; and
  - process-descriptive models that show the influence of factors on outcomes.

In mathematical models the relationship between cause and effect is explicitly formulated, while these relationships may be unknown in experimental methods. Illustrative models are meant to give an impression of certain elements of a future situation (e.g., the visual appearance, noise levels) while physical models represent physical processes to scale. Laboratory experiments are set up for simulating biological and biochemical processes, often by isolating a specific process (bio-assays) or by isolation of a total ecosystem (a 'mesocosm'). Field experiments aim to study changes in reality.

Impacts can be forecast for several systems such as surface water, atmosphere, groundwater, the bio-system, noise, and human well-being.

Surface water impact forecasting

Impacts on hydraulic and hydrological conditions include changes in flows, in water current velocity and direction, in water levels and volumes, stationary time, water stratification (temperature and sediments) and overall changes in the watershed. Predictions can be made using mathematical modelling.

Changes in hydraulic conditions may have an influence on sediment transport and morphology, resulting in increased sedimentation or scouring. Mathematical process-descriptive models can be applied for predictions.

Changes in water quality may be caused by discharges of pollutants from point or non-point sources, influenced by transport and physical, chemical and biological processes. Mathematical process-descriptive models can predict these changes.

Atmospheric impact forecasting

The emission of substances into the atmosphere (e.g. by construction activities) can be derived from information on the activity. Changes in concentrations of atmospheric pollutants can be predicted with mathematical dispersion models.

Groundwater impact forecasting

Changes in the groundwater can be predicted using mathematical models. These changes include changes in direction and velocities of flows, depth of the water table, and hydraulic gradients. Changes in groundwater quality from contaminants can be predicted by mathematical models of groundwater.

Biota impact forecasting

Physical disturbances such as the removal of plants, animals and habitats by occupation of land and construction can be predicted by surveying the existing populations or habitats in the affected area. Predicting the effects of a disturbance is much more difficult. Predicting the effects of environmental contamination on plants and animals requires data showing the relationship between the dose or concentration of the pollutant and the effect. For some pollutants, these dose-effect relationships are known. For the prediction of changes in productivity and composition of plant and animal communities and habitats, which are usually longer term effects, only a few very specific mathematical models exist.

Noise forecasting

Empirical models are available to predict noise emissions. Sound (noise) around or alongside sources of emission (e.g., construction sites) can be estimated with mathematical models.

Human health and welfare impact forecasting

Risks to human health and welfare arise from accidents and from general environmental changes where new substances are introduced into the environment. For certain hazardous activities data on accidents and risk assessment and hazard identification methods are available.

Changes in air, water, soil and food quality, changes in sound levels, changes in micro-organisms and vectors causing or carrying disease, and changes in work and incomes may eventually also have effects on human health. Although the literature on human health effects is very extensive and some dose-effect information is available from toxicological and epidemiological studies, there are few formal methods available to predict these effects.

4.3.9 Assessment of impacts

Predicted impacts are normally in quantitative or qualitative formats. To be useful as decision options for decision-makers, reporting needs to include:

- A systematic overview of all of the alternatives and all relevant predicted impacts for each of them;
- Information on the absolute or relative importance of an impact for the different alternatives (a form of 'scaling'); and
- Information on the relative importance of impacts for a specific environmental characteristic or component, compared ('weighting').

The keys to the presentations are as follows.

Systematic Overview: The systematic overview of all relevant impacts can best be presented in a matrix, showing environmental aspects on one axis and different alternatives, including the 'take no-action' alternative, on the other axis.

The overview can be improved by aggregating and excluding groups of alternatives and environmental characteristics. For example, the presentation can:

- Exclude alternatives with unacceptable consequences (e.g., violation of environmental standards or policies);
- Exclude environmental impacts which do not produce relevant differences between alternatives; and
- Aggregate impacts within categories (e.g., impacts to surface water, human health and welfare) using weighting factors together and scaling values (described below).

Scaling and Significance: A systematic overview does not provide information on the relative importance (significance) of an impact for the various alternatives. General criteria that can be applied to assess the significance of an impact are the:

- Geographic scale of the impact: Is it confined to a specific site only, or beyond to the local, regional, national or transboundary environment?
- Time horizon and duration of the impacts: Will the impact be felt in the short, medium, or long-term? Will the impact be temporary (e.g. during construction only) or long-lasting;
- Magnitude of the impact (i.e., small, moderate, or large); and
- Reversibility of the impact: Can the impact be reversed by specific measures or are remedial measures un-available?

The significance of a predicted impact can be assessed by:

- Comparing it with existing (environmental) standards and legislation and policies: Are water quality standards or air quality standards violated as a result of the project?
- Scrutinising it against priorities and preferences, including the level of public concern; and
- Collecting scientific and professional evidence for:
  - loss to or disruption of valued resource stocks, ecological functions or geographic areas;
  - negative social impacts, harms to quality of life and livelihoods; and
  - loss of potential land and resource use opportunities.

Compliance with Standards: Environmental standards and legislation that are of relevance to flood risk management projects include:

- International conventions on the environment. Amount these are the Ramsar Convention on the wise use of wetlands, the CITES convention on the International Trade of Endangered Species and the Indigenous and Tribal Peoples Convention of the ILO.
- Water Quality Standards. Most countries have national standards. International standards are available from the World Health Organisation (WHO, International Standards for Drinking Water) and in Europe, from the European Commission;
- Protected areas legislation. Countries have national designated areas for the protection of cultural, archaeological, historical, environmental or biodiversity conservation. Note that the transboundary nature of certain impacts may affect protected areas in neighbouring countries. There are also international standards;
- National and local planning regulations in floodplain areas; and

- National and international occupational health and safety standards. Most countries have national standards. International standards are available from the International Labour Organisation (ILO) and the World Bank (WB);

Impact Significance Measures: Certain environmental priorities and preferences may be valued by the government, non-governmental organisations or the general public without yet being reflected in environmental laws and regulations. Examples at the global level are biodiversity, climate change and cultural values. At the local level this may include specific sites, flora and fauna valued by local communities for cultural, historical or medicinal values and visual aesthetics.

Important issues to consider in the assessment of the significance of an impact on the natural resources and resource use, as well as on the social values/quality of life are:

- Loss of rare or endangered species, or their breeding and foraging habitats;
- Reduction of species diversity, or increase in exotic or invasive species;
- Loss of critical productive wildlife habitats;
- Transformation of natural landscapes, such as wetlands;
- Toxic impacts to humans or wildlife;
- Reduction in the capacity of renewable resources to meet the needs of present and future generations; and
- Loss of lands and resources currently used for traditional or cultural purposes.

4.3.10 Mitigation measures

Mitigation is the stage of the EIA process when measures are identified to avoid, minimise or remedy adverse impacts or to enhance environmental and social benefits of a proposal. Mitigating measures should be addressed early on in the EIA process in a dialogue between the environmental and the design teams to ensure incorporation of mitigating measures in alternatives and design options. At present, mitigation commonly only receives attention once the potential impacts of a proposal are reasonably well understood; i.e. after impact identification and forecasting.

As with projects, themselves, two categories of mitigating measures can also be distinguished: structural measures *(*such as design or location changes, engineering modifications or site treatment) and non-structural measures *(*such as economic incentives, legal, institutional and policy instruments, provision of community services and training and institutional support).

It is recommended to apply a three step approach to impact mitigation at different stages of project planning:

1. Impact avoidance. This step is most effective when applied at an early stage of project planning. It can be achieved by:
   - cancelling certain projects or eliminating elements that may result in adverse impacts;
   - avoiding areas that are environmentally sensitive; and
   - adopting preventative measures to stop adverse impacts.
2. Impact minimisation. This step usually begins during the stage of impact identification and forecasting in an attempt to reduce the degree, extent, magnitude or duration of adverse impacts. It can be achieved by:
   - scaling down or relocating the project;
   - redesigning elements of the project; and
   - introducing measures to manage the impacts.
3. Compensation. This step is applied to remedy unavoidable residual adverse impacts. It requires:

- rehabilitation of the affected site or environment, such as through habitat enhancement and restocking of species like fish;
- restoration of the affected site or environment to its previous state or better, such as restoring construction sites; or
- replacement of the same resource at another location, such as wetland engineering to provide an equivalent area to that lost to drainage or land fill.

Reports need to describe the effectiveness of mitigating measures as well as their feasibility, costs and benefits.

Recommended feasible mitigation measures for each of the potential environmental impacts of flood risk management projects are summarised in the Checklist of Environmental, Economic and Social Impact in Appendix 6.

4.3.11 Environmental management plan

An important component of the EIA report is the environmental management plan (EMP).The EMP should provide an overview of the mitigating measures and other project conditions necessary to ensure compliance with environmental laws and regulations and to reduce or eliminate anticipated adverse impacts. The EMP should also summarise available measures to enhance environmental conditions and offer a monitoring plan to ensure that environmental issues will be closely scrutinised and form the basis of impact management during project construction and operation.

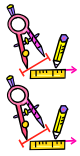
The following are typically included in an EMP:

- Summary of potential adverse impacts that require mitigation;
- Description of mitigation measures with reference to the impact to which it relates and the conditions under which it is required (for example, continuously or in the event of contingencies);
- A mitigation monitoring program;
- Institutional arrangements and responsibilities for mitigation and monitoring;
- Implementation schedule and reporting procedures for mitigation measures, including timing, frequency and duration as well as procedures for measuring progress and results;
- Contingency plans in the event that impacts are more serious than predicted; and
- Cost estimates and financing sources for both the initial investment and recurring expenses for implementing all measures contained in the EMP.

The EMP must be binding and provide the basis for an enforceable contract with project proponents. At the same time, proponents and primary stakeholders should be able using the EMP to establish environmental performance standards for those carrying out the works or providing supplies.

4.3.12 Monitoring

Monitoring in the EIA is useful for:



- Assessment of the baseline conditions;
- Assuring project compliance with agreed-upon conditions;
- Continual review of the extent and severity of the environmental impacts against the predicted impacts;
- Identification of trends in impacts;
- Evaluation of the effectiveness of the prescribed mitigation measures; and

- Evaluation of the overall effectiveness of the EMP.

To meet these objectives, environmental monitoring must begin before and continue throughout project planning as well as project implementation and operation.

Monitoring should follow an environmental monitoring plan that describes the parameters to be measured, how, when, and where the monitoring activities will be undertaken, who will implement them, and who beyond the primary stakeholders will receive the monitoring report. The monitoring plan should contain information on:

- The scope and objectives of monitoring for each of the impact and other key indicators selected for monitoring;
- The selection of sites for observation, measurement and sampling;
- The methods to be applied for sampling and data collection;
- The frequency and period of observation, measurement or sampling;
- The level of accuracy required;
- Data analysis procedures;
- Recording, organising and reporting of the data;
- Independent checks for quality control and reliability of the data;
- Thresholds of impact acceptability and requirements for management action if monitoring indicates the levels are exceeded (including emergency planning); and
- The budget, resources and personnel, required for implementing out the monitoring program.

In designing the monitoring program the technical, financial, and management capabilities of the institutions carrying out the monitoring need to be considered to ensure the competence, integrity and transparency of the process at the outset.

It is recommends that monitoring include simple observation and reporting techniques that can include primary stakeholders as an open and participatory check on the process.

4.3.13 Reporting requirements

The EIA report or impact statement is, first of all, a document for decision-making. Its audience includes not only the authorising and implementing agencies, but also other interested parties and the affected public. The information collected and a synthesis of the results of studies and consultations should be reported with a full, yet concise, account of the likely environmental impacts along with recommended mitigation measures for these impacts and any residual effects.

The report should contain a coherent statement of the potential impacts of a proposal and the measures that can be taken to reduce and remedy them, to be used by:

- The project proponent to implement the proposal in an environmentally and socially responsible way;
- Responsible public authorities, to make informed decisions on the proposal, including the terms and conditions that must be attached to an approval or authorisation; and
- The public, to fully understand the proposal and its likely impacts on communities, individuals, and the environment.

A successful EIA report that meets these requirements will be:

- Actionable, to achieve environmentally sound planning and design;

- Tool-oriented, containing information necessary for project authorisation and, if applicable, permits and licensing; and
- User-friendly, communicating technical issues to all parties in a clear and comprehensive way.

Because of its importance as a communications tool, the EIA report needs to be well organised and clearly written. Effective reports are written both in plain language understandable to non-experts, and containing appropriate technical standards for expert use.

In most countries, the information to be included in an EIA report is specified in legislation, procedures or guidelines (see Section 4.2). International banks like the World Bank and ADB also have pre-described reporting formats for their investments. Normally, the content of an EIA report is determined in accordance with specific terms of reference established during the scoping process.

An EIA report should include many or all of the following headings and items:

- An executive or non-technical summary (which may be used as for public communications);
- A statement of the need for, and objectives of, the project;
- Reference to applicable legislative, regulatory and policy frameworks;
- A description of the project and how it will be implemented (construction, operation and closure/transfer);
- Comparisons of the project with alternatives (including the 'no-action' alternative);
- A description of the project setting, including the relationship to other proposals and relevant policies and plans for the area;
- A description of baseline conditions and autonomous developments (bio-physical, socio-economic trends, etc.);
- A review of the public consultation process, the views and concerns expressed by stakeholders and the way these have been taken into account;
- Consideration of the main impacts (positive and adverse) that are identified as likely to result from the project, their predicted characteristics (e.g. magnitude, likelihood, timing, etc.) proposed mitigation measures, the residual effects and any uncertainties and limitations of data and analysis;
- An evaluation of the significance of the residual impacts, preferably for each alternative, with an identification of the best practicable environmental option;
- An environmental management plan that identifies how proposed mitigation and monitoring measures will be translated into specific actions as part of impact management. (The environmental management plan can be included in or annexed to the report; or may even be a separate document); and
- Appendices containing supporting technical information, description of methods used to collect and analyse data, list of references, etc.

Among the above sections, the executive summary should offer a concise description of the main findings and recommendations. It should not be meant to summarise all of the contents of the EIA report. Instead, the focus should be on the key information and options for decision-making. The executive summary should be kept short, since it is often the only part of the report that decision-makers and most readers will read. It can be presented for distribution to the public as an information brochure.

The executive summary should describe the:

- Project and its setting;
- Terms of reference for the EIA;
- Results of public consultation;
- Alternatives considered;

- Major impacts and their significance;
- Proposed mitigation measures;
- Environmental management plan; and
- Any other critical matters important for decision-making.

4.4 Environmental Impact Assessment quality review

A review of the quality of an EIA report must ensure that the information provided by the report complies with the EIA guidelines/terms of reference, professional standards and integrity, and that it is sufficient for decision-making purposes. It is a final check on the completeness and quality of the information gathered in the EIA report and submitted for project authorisation. Often, reviews lead to calls for additional information on potential impacts, mitigation measures or other aspects.

The objectives of EIA review are to:

- assess the adequacy and quality of an EIA report;
- respond to and incorporate public comments;
- determine if the information is sufficient for a final decision; and
- identify any deficiencies in professionalism, legal compliance, ethics, or objectivity that must be addressed before the report can be submitted.

A comprehensive review of the adequacy and quality of an EIA report must answer the following questions:

- Does the report address the Terms of Reference for the EIA study?
- Is the necessary information provided for each major component of the EIA report?
- Is the information correct and technically sound?
- Does it fully meet the standards of professionalism, integrity, accountability, ethics, transparency, inclusiveness, legality and freedom from conflicts of interest?
- Have the views and concerns of affected and interested parties been taken into account?
- Is the statement of the key findings complete and satisfactory (e.g., for significant impacts, proposed mitigation measures, etc.)?
- Is the information clearly presented and accessible to decision makers and the public; and
- Is the information relevant and sufficient for the purpose of decision-making?

The last question is the most significant one for assessing the usefulness of review conclusions, and determines whether or not an EIA can be submitted as is or requires revisions.

To ensure minimal objectivity of an EIA review, reliance is recommended on inter-agency committees or independent panels or tribunals where they exist and can meet outside standards of review. Free, open and protected public input, oversight and challenge procedures are also an integral means of reinforcing objectivity and assuring the quality of information. Public review of reports requires, at an absolute minimum, reasonable time and opportunity for interested parties to comment, following a set period for public review and a formal notification procedure offering open access and a safe and open procedure for the filing of comments. The Preferably open review processes are followed with public hearings and other means to solicit and protect the views of all interested and affected parties.

4.5 Public participation

Timely, well planned and appropriate public involvement is an integral part of EIA studies and is essential to the successful design, implementation, operation and management of projects. Public involvement provides valuable information on the (bio-physical and socio-economic) baseline conditions, resource use of local communities, key impacts, potential mitigation measures and for the identification and selection of alternatives. It ensures that the EIA process is open, transparent and comprehensive.

Public involvement should include both public consultation (or dialogue) and decision-making. The objectives of public participation in the EIA process are to:

- Improve project design by:
  - soliciting full information on possible impacts from the project, including issues of cultural sensitivity and local significance;
  - incorporating local and traditional knowledge into the process;
  - identifying project alternatives, mitigation and management measures, which are acceptable to affected peoples; and
  - maximising benefits while minimising conflicts;
- Recognise the ownership and assure the acceptance of the project by affected parties; and
- Ensure informed and equitable decision-making.

It is recommends that the public participation process for EIA studies include primary (affected communities and ethnic communities and members of the public), secondary, and tertiary stakeholder groups as presented in Chapter 3 of this report.

Most EIA systems already make some type of provision for public involvement. The legal and procedural requirements for this purpose vary from one country to another, but ideally, public involvement should begin during the preparatory stage of project development and continue throughout the whole EIA process. The emphasis of public contributions should be on participation in:

- Screening, including those likely to be affected in order to gain a better understanding of the nature and significance of the likely impacts (this information can assist in determining if an EIA is required and at what level).
- Scoping to ensure that all the significant issues are identified, local information about the project area is collected, and alternative approaches achieving the project objectives are considered.
- Impact analysis and mitigation that avoids biases and inaccuracies in the analysis, incorporates local values and preferences, supports the design of appropriate mitigation measures, and helps in selecting the most practical alternatives, and
- Review of EIA quality through public comment, public hearings and meetings as part of EIA review.

Furthermore the public should be involved during project implementation and follow-up when the environmental impacts are monitored.

The terms of reference for the EIA study should include specifications for the proposed public involvement. These specifications could also be presented in the form of a separate Public Participation Plan. In case such plans are used, they should outline:

- public participation activities;
- actions needed to implement them;

- roles and responsibilities of those involved;
- available budgets; and
- scheduling of events.

It is the responsibility of governmental authorities and the project's institutional stakeholders, to ensure that public participation takes place in a timely and appropriate manner during the EIA process. Note that from the perspective of law, if this responsibility is to be enforceable, it also requires an enforceable 'right' on behalf of the public, with real powers and sanctions.

The final EIA report should contain a description of activities undertaken as part of the public participation process so that reviewers can monitor compliance with best practices in public oversight and control.

The EIA report should include a description of the:

- Public consultation plan, including work schedule, timing, and budget;
- Methodologies used to inform and involve stakeholders in the EIA process;
- Stakeholders, with documentation of public meetings and interviews, including dates, names (or indications of protected identity), topics of discussion, and important outcomes
- Information and feedback gathered during the consultation, including the key issues and concerns raised, and an analysis and discussion of this data; and
- Recommendations on how the project might address or mitigate issues raised during public consultation; and
- Recommendations for on-going public consultation during the implementation of the project or program and its Environmental Management Plan.

4.6 Strategic Environmental Assessment

An EIA is applicable at the level of individual projects/measures. By contrast, a Strategic Environmental Assessment (SEA) is used to judge policies, plans or programs on their broad socio-economic and environmental impacts.

Strategic Environmental Assessment is a package of approaches designed to integrate environmental considerations into policies, plans and programs and to evaluate their inter-linkages with economic and social considerations. (See the Netherlands Commission for Environmental Assessment, www.eia.nl for a full description). As such, the SEA is an approach useful in structuring the public and government debate in the preparation of policies, plans and programs. It feeds a robust assessment of the environmental and, where required, social and economic consequences into this debate. Finally, the procedure ensures that the results of the assessment and the debate are taken into account during decision making and implementation. Public participation, transparency and good quality information are key principles in the process. If applied well, SEA can contribute to sustainable development protections, long-term poverty reduction and good governance.

The advantages of SEA over an EIA are:

- Enhanced credibility in the eyes of stakeholders, leading to swifter implementation of environmental protections;
- Better understanding of the cumulative impact of a series of smaller, individual, projects and of the context;
- Better insight in the trade-offs between environmental, economic and social issues; and
- Easier assessment at the project level (later stages) because strategic discussions, e.g., on locations, have already been brought to a conclusion.

Whereas EIA aims to improve projects, SEA aims to improve strategies. Its focus ranges from legislation and country-wide development policies to more concrete sector and spatial (transboundary) plans. The key phases of SEA resemble those of EIA. However, the actual tasks during those phases may be quite different:

Table 4-1 Comparison between an SEA and EIA.

	SEA	EIA
Process	Iterative, interactive and strategic	Linear
Screening	Mostly decided case by case	Projects requiring EIA are often listed
Scoping	Combination of political agenda, stakeholder discussion and expert judgment in a wide context	Combination of local issues and technical checklists in a narrow focus on impacts
Public Participation	Focus on representative bodies and policy making on overall long-term goals	Often includes general public to offer specific inputs
Assessment	More qualitative (expert judgment)	More quantitative technical measurement
Quality review	Both quality of information and stakeholder process components	Focus on quality of information
Decision making	Comparison of alternatives against policy objectives	Comparison of projects against norms and standards
Monitoring	Focus on plan implementation for overall results	Focus on measuring actual impacts

An Example: SEA for Mainstream dam construction

MRC Member States, at the Informal Joint Committee Meeting held in Vientiane in June 2008, agreed that there are clear advantages in moving environmental assessment away from individual projects towards considering the cumulative and basin-wide impacts of multiple projects using Strategic Environmental Assessment (SEA) techniques. This view was shared by participants of the regional consultation meeting on the MRC Hydropower Programme held in Vientiane in September 2008.

Eleven hydropower schemes are at various stages of project preparation for the Lao, Lao-Thai, and Cambodian reaches of the Mekong mainstream as of the writing of this report in 2009 Implementation of any or all of the proposed schemes could have profound and wide-ranging socio-economic and environmental impacts in the four riparian countries of the LMB

Under the new Initiative on Sustainable Hydropower, MRC will shortly initiate a SEA that seeks to identify the potential opportunities and risks of hydropower as well as the potential contribution it can make to regional productivity growth. Current trends and alternative mainstream hydropower development strategies will be considered with respect to productivity growth, social equity and environmental protection.

The SEA will consider all planned and committed hydropower and other development activities in the Lower Mekong Basin (LMB), focusing on the Mekong River mainstream. Its results will feed into the broader basin-wide assessment of various development scenarios undertaken in the Basin Development Planning Programme Phase 2 (BDP2). The assessment will test the process and benefits of SEA in identifying likely positive and negative impacts on environmental variables in the LMB, as well as their temporal and spatial distributions. Key outputs will include recommendations on the mitigation and monitoring of impacts, and technical, policy and institutional guidance for SEA and hydropower development in the LMB. The exercise will also build capacity for future use of the SEA approach, principally within the National Mekong Committees, national agencies responsible for electric power generation and those concerned with facilitating the application of SEA and environment impact assessments.

CHAPTER 5

PRACTISES FOR SOCIAL IMPACT ANALYSIS

5 PRACTICES FOR SOCIAL IMPACT ASSESSMENT

5.1 Purpose and scope

The purpose of the social evaluation of FRM measures is to define the strategies and specific measures that will:

1. Enhance the social objectives of the project, for example, to reduce poverty over the long-run (rather than just through eliminating symptoms in the short-run through quick income generation);
2. Ensure equitable benefits for different social groups;
3. Promote local ownership for the FRM measures through stakeholder participation;
4. Minimise and compensate adverse social impacts, particularly those that affect the sustainability of cultures, communities and vulnerable groups; and
5. Monitor the social outcomes and impacts to identify any needs for further measures.

Social assessment is an integral part of the environmental, economic and social evaluation of a project to implement FRM measures and includes the following activities:

1. Collection and analysis of quantitative and qualitative data about different stakeholders, how they affect and/or are affected by the FRM measures and the resources and capacities they have to address potential benefits and adverse impacts;
2. Dissemination and exchange information between project proponents, beneficiaries and other stakeholders during preparation, implementation and monitoring of the project; and
3. Development of project strategies to strengthen and incorporate the socio-cultural and institutional contexts.

The second and third activities in the above list are those of stakeholder participation in the context of sustainable development and good governance, and are discussed in detail in Chapter 3. This chapter outlines the principal social evaluation methods and tools that are used for analysing how different stakeholders are affected by flood risk management measures.

There are several different approaches to researching and analysing existing conditions and trends and identifying the key social concerns of a FRM project. All approaches, however, should include public participation and accountability in coordination with government actors. The stakeholder analysis presented in Chapter 3, for identifying the primary, secondary (and tertiary) stakeholders and their roles (see Section 3.11.1) combined with socio-economic profiles of communities (described below in Section 5.2) provide basic information on interests and impacts. In some instances, socio-economic profiles, the main tool in social assessment, can be broadened from their standard geographic overview to include detailed information on women, poor households and minority ethnic groups. An institutional analysis (see Section 5.4) is an important tool to understand the roles, responsibilities and capacities of the government agencies and other organisations that are responsible for the implementation of the project, as well as the resources of affected communities.

5.2 Socio-economic profiles

5.2.1 Purposes and uses of socio-economic profiles

Socio-economic profiles document the existing conditions and future trends in the project area for population and household characteristics, social development (health and education), economic activities, and land and other productive assets, etc. The socio-economic profiles

provide a benchmark for the identification and assessment of economic and social impacts. They also document the vulnerability of communities to the risks and effects of flooding.

Socio-economic profiles are used in several ways as part of social and environmental assessments of projects to implement FRM measures. The profiles document the economic, social and cultural conditions and relations of peoples and groups living and working in the local communities in the project area of the proposed FRM measures. They list the groups living in the project area, their key demographic and socio-economic characteristics, including their incomes and livelihoods, as well as their forms of social organisation. This standard information is then useful alongside a FRM strategy to:

1. understand the key issues, opportunities and constraints created by different FRM measures, demonstrating the impact on different groups, views of potential benefits of a project and concerns over potential adverse impacts?
2. establish a baseline against which changes resulting from various FRM measure can be assessed.

Socio-economic profiles are used in three parts of the environmental and social assessments of an FRM project, including:

1. Social assessment: To identify key social groups and issues that needs to be addressed in the development of a project, such as the need to develop strategies to ensure that women benefit equally from the improved flood risk management.
2. Land acquisition and resettlement: To document the conditions and threats to social groups that are affected by land acquisition for the project; and, to establish a baseline and measure of legal enforceability to assess whether these groups will be able to restore living conditions and livelihoods following land acquisition and/or relocation or will be at risk.
3. Environmental assessment: To document the health, socio-economic and other conditions of groups/communities in the project area in terms of the potential impacts of the project.

5.2.2 The scope of a socio-economic profile

The types of information that may be included in a socio-economic profile is summarised in Table 5-1. The following guidelines should be considered in what to include and how to organise it:

1. A user-oriented socio-economic profile is clearly written, concentrating on the social, economic and other conditions that are most important in the context of the FRM project and offering direct warnings and recommendations. The types and amount of information should respond to the following questions:
   a. What are the anticipated benefits or adverse impacts of the project on each community and strata and population characteristic in the short-term and projected over the long-run (given expectations on population growth, resources, productivity, and consumption)?
   b. In the context of these anticipated benefits and impacts, what additional information is needed about the people and their conditions in the project area in order to best serve their interests within their values and perspectives?

2. The socio-economic profile should provide sufficient detail to understand how different groups are affected by a project. Information should highlight special conditions for some or all of the following types of social stratification:
   a. Gender: What are the conditions and roles of men and women within households and communities (heads of households, male/female ratios)? What are the quality of life

indicators for men and women (life expectancy, education, literacy, health status)? What are the roles and responsibilities of men and women in livelihoods, health or other concerns of households? What is the level of participation of men and women in user groups, community organisations, political decision-making, military and police, financial authority, and local government?

b. Ethnicity: What are the distinct conditions of different ethnic groups and what are the key components of their ethnic identities, survival strategies and sustainability in relation to their environments and to other groups? What are the demographic characteristics and social organisation of households and communities? What are the threats to their maintenance of local languages, local education, and traditional livelihoods and lands, and relations to and protection of natural resources, and what opportunities do they need to access power to protect these against outside interference? What is the level of their participation in user groups and community organisations? What are their important cultural characteristics and the keys to sustainability?
c. Social strata by class, profession, economic inequality and mobility, and poverty: What are the opportunities and constraints for poor and non-poor households or groups for social mobility? What are the demographic characteristics of poor households, the level of social development, their livelihoods, economic activities and incomes, access to land and other resources, participation in community affairs, and other barriers? What political barriers and class barriers maintain social inequities? If there are ethnic differences, are the differences in wealth and consumption between ethnic groups part of the free choices of consumption patterns that require protection, or is the poverty actually destructive of the maintenance of traditional and sustainable existence within their environments?
d. Age cohort groups: What are the opportunities and constraints for young adults, the elderly or other age groups, for example, related to level of social development (education, literacy, health status), livelihoods and economic activities, and social and economic vulnerability? What cultural influences and pressures on different age groups are undermining the cultural and social fabric or creating new burdens on particular groups that are a threat to long-term sustainability?

Table 5-1 Types of information needed for a socio-economic profile.

Socio-Economic Profiles: types of Information	
Demographic factors	▪ Household: age/gender structure of members, household size, household head, fertility rates and marriage patterns. ▪ Community: size, density, ethnicity, population growth, migration patterns, consumption and per-capita wealth.
Social development	▪ Education: school enrolments and commitments to non-traditional education and values, levels of State and traditional education attained and literacy rates in local and national languages; access to schools and traditional learning, physical conditions and available resources. ▪ Health: mortality and malnutrition rates, principal diseases, women's and children's health status; access to health care, physical conditions and available resources, long-term population balances with the environment and how changes impact these balances.
Land, housing and other assets	▪ Land: land uses, areas and tenure by principal types of productive land (agricultural, fish ponds), residential and urban land (commercial, institutional, industrial) and common land (common-use land, unallocated land), military and governmental land. ▪ Houses and other structures: structures by use, construction and ownership including foreign ownership and influence. ▪ Assets: transportation, productive and other household assets.

Socio-Economic Profiles: types of Information		
Rural livelihood activities	Categories of activities ▪ Rice cultivation; ▪ Other food and cash crops; ▪ Aquaculture/capture fishing; ▪ Livestock; ▪ Harvesting natural resources (forests, wetlands); ▪ Administrative, policing and control authorities; ▪ Religious, ceremonial and other services.	Types of information ▪ Types of rice, food and cash crop, aquaculture/fishery, livestock, harvested products; ▪ Number of households by types of crops, livestock, etc. ▪ Area of holdings per household by type of crop (and irrigation); ▪ Annual yields by crop; used and sold; ▪ Agricultural inputs; ▪ Local taxation, investments and other services or controls in budgets.
Local and regional economic activities	Categories of activities: ▪ Household businesses/cottage industries; ▪ Markets/market vendors; ▪ Local commercial/ industrial enterprises; ▪ Regional commercial/industrial enterprises; ▪ Public and governmental activities.	Types of information: ▪ Types of activities for each category; ▪ Number of people involved by types of activity: men, women, owners, employees, unpaid workers; ▪ Trends and plans for future development.
Income and poverty levels	▪ Household income: principal sources of income, income levels; ▪ Wage/non-agricultural income: access to wage opportunities, men/women engaged in wage employment; ▪ Job-related migration: cyclical and long-term movements, men/women involved in job migration, role of remittances in household income; ▪ Income poverty levels: % of households by household characteristics, ethnicity, etc. ▪ Non-income dimensions of poverty: key issues.	
Infrastructure	Categories of infrastructure ▪ Irrigation; ▪ Water supply/sanitation; ▪ Electricity; ▪ Transport (road, inland waterway); ▪ Communications.	Types of information ▪ Types of equipment and/or services by category; ▪ Number of households, businesses or others serviced.
Social organisation (households, communities)	▪ Kinship exchange patterns; ▪ Decision-making in the household (roles, responsibilities); ▪ Participation in community affairs (by gender, roles and responsibilities); ▪ Community user groups (e.g., irrigation, water supply, farmers cooperatives, etc.); ▪ Community organisations (women, ethnic groups); ▪ Other stakeholder organisations (with attention to their goals, priorities, etc.).	
Local governance	▪ Local government institutions, roles, responsibilities and capacities.	

5.2.3 Methods for preparing socio-economic profiles

Socio-economic profiles should be prepared as early as possible in the planning and design of the FRM project so as to inform and influence planning and preparation in different stages and

to increase primary stakeholder participation. Different methods and tools can be used to gather the data and information that will be reported in the profiles. These include:

1. Government data sources: Government statistics, policies and programs often include relevant information. Among these are statistical yearbooks for the local district, government policies on poverty or reports of census data and socio-economic surveys.

Table 5-2 Examples of LMB governmental data sources.

Government data sources: examples	
Cambodia	▪ Census reports (www.nis.gov.kh) ▪ Socio-economic surveys ▪ Demographic and health surveys ▪ Labour force surveys ▪ National human development reports ▪ Commune databases
Lao PDR	▪ Census reports (www.nsc.gov.la) ▪ Lao Expenditure and Consumption Surveys ▪ Demographic and health surveys ▪ Labour force surveys ▪ Additional poverty and socio-economic surveys
Thailand	▪ Census reports (www.nso.go.th)
Viet Nam	▪ Census reports (www.gso.gov.vn) ▪ Viet Nam Living Standards Surveys ▪ Demographic and health surveys ▪ National human development reports ▪ Statistical yearbooks (by province and district)

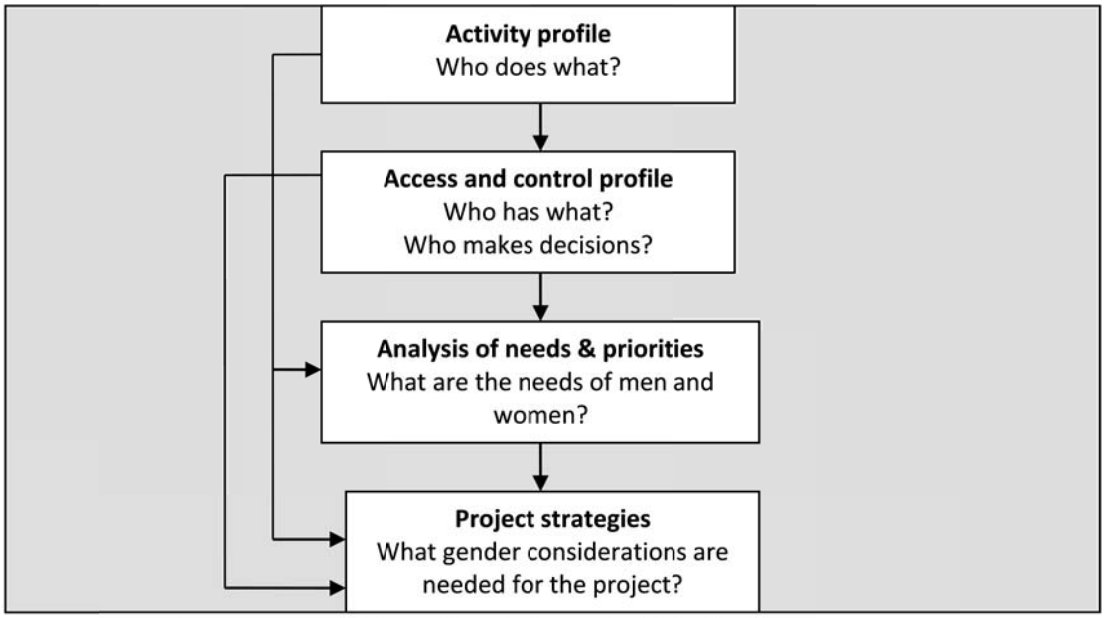
2. Donor agency and other secondary data sources: Donor agencies and project reports for donor-funded and other projects as well as university studies are potentially useful sources of information.
3. Primary data collection: Sample surveys in the project area can collect relevant quantitative data from households and businesses as well as from local authorities.
4. Participatory information sharing: It is often useful to establish a consultative process with residents of the project area, in order to gather information, identify key issues and discuss options and strategies.

5.2.4 Gender assessment

Women have important roles in the livelihood and economic activities of rural areas and often have double or triple burdens in the division of labour. They work alongside men to cultivate rice and are often responsible for growing food crops as well as processing agricultural and fish products for use by their households and for sale. They are also responsible within their households for the majority of household work: caring for the health and well-being of children, making sure there is sufficient food for household members and caring for the elderly and the sick. Floods have significant impacts on the activities of women. In general, socio-economic profiles should include sex-disaggregated data and analysis of the proportion of female-headed households in the project area for the FRM project and of women's roles. It may be necessary to conduct a separate gender assessment to identify the benefits and risks for women and to provide the basis for a gender strategy and/or specific gender actions.

While women may contribute the largest portion of labour, men in the region often face specific risks and have specific needs while facing particular expectations. Several social obligations may put the physical and mental health of men at risk.

In the context of a project to implement FRM measures, a gender assessment should pose several key questions following the steps of gender assessment shown in Figure 5-1:



Sources: www.grdc.org; www.genie.ids.ac.uk/gem/index_sectors/infrastructure/in_tools1

Figure 5-1 Gender assessment steps.

Who does what?

The activity profile considers all types of activities: (i) income generating activities such as subsistence agriculture, self-employment and paid work; (ii) household labour activities such as domestic work, raising children and caring for the sick and elderly; and (iii) community activities such as participation in user groups, community organisations and local government.

1. Who does what tasks? This question asks about the division of labour and social roles. Which tasks are men's responsibilities and which are women's for different types of activities (e.g., preparing rice fields, planting and transplanting rice, weeding, harvesting, etc.)?
2. How much time is spent on different tasks and activities? For example, how often is water or firewood collected? How much time do different activities take? How do the tasks vary between the dry season and the flood season?
3. Where do different activities take place? Do they occur in or the near the house, elsewhere in the village, in specific locations (such as markets), in rice fields? What are the distances and travel times involved in these activities?

Who has what?

In understanding gender relations, it is very important to understand which assets and resources are available to and controlled by men and women. In the terminology of economists, these include forms of social empowerment (e.g., literacy and health status); natural assets (access to productive and other types of land, labour); social assets (i.e., social networks); physical assets (e.g., tools, equipment and infrastructure); and, financial assets (capital and income; access to credit). The key questions are:

1. What livelihood assets and opportunities do men and women have access to?

2. What constraints do they face?

Who make decisions?

Equally important are questions about what decisions are made by men and women at (i) the household level, over household expenditures and (ii) the community level, that is, decisions about the management of community affairs and resources. The key questions are:

1. What decision-making do men and/or women participate in?
2. What decision-making do men and/or women usually control?
3. What constraints do they face?

What are the needs of men and women in the context of cultural sustainability?

In the context of the FRM project and based on the gender analysis, the next step is to identify what the needs and priorities of men and women that should be addressed in the design and implementation of the project in the context of the sustainability of their cultures and communities. The key questions are:

1. What are women's and men's needs and priorities?
   The answers may include practical needs such as safe drinking water during wet and dry seasons to facilitate women's work of providing water for household need; and/or, strategic needs of women such as new opportunities such as increasing women's roles and participation in decision-making for irrigation systems.
2. What are the capacities of men and women with respect to benefiting from and participating in the project? What constraints do they face?
3. What are the current social expectations on men and women that create different physical risks, status obligations, or contribute to their self-esteem and psychological and mental health? In many communities, men are expected to participate in different forms of violence, or turn to self-destructive behaviours when they feel threatened. How do the projects impact on these expectations, social roles and their implications for physical and mental health and self-protective behaviours for men and women?
4. What are expectations on boys and girls in their social roles, household labour, and potential that will be affected by environmental and economic changes brought by the project?

5.2.5 Poverty profiles

The socio-economic profile should clearly document the available information on the poverty levels in the FRM project area, as well as the characteristics of poor and non-poor households in relation to non-income dimensions of poverty. If it is done correctly, it will not only focus on current symptoms but will include long term population and sustainability projections that look at resources and overall per capita wealth (including landholdings) and poverty for scenarios projected at least two generations into the future. It will also explain the root causes of poverty and link solutions to these to sustainable development plans, while recognising as well that different cultural groups area also entitled to different consumption patterns and should not be forced to lose their cultures in order to live like other groups. Local authorities are good sources of information about what households are designated as poor and what are the challenges and difficulties they face. In addition, organising Focal Groups with local people to discuss how and why people are poor will quickly provide much valuable information about what may be needed to ensure that poor as well as non-poor households benefit from the FRM measures.

Note that the adverse impacts of FRM measures may affect poor households more than non-poor households, or in significantly different ways. Many poor families have little choice but to

build their homes of poor-quality materials and to locate them on flood-prone land, in towns and urban areas where other, safer land is not available to them. Due to their poverty, they may also have difficulty in accessing the benefits of FRM measures. Therefore, if the socio-economic profiles for the project reveal high levels of poverty or structural inequality, it may be useful to prepare separate poverty profiles for disadvantaged social groups or geographic areas (e.g., villages).

In a poverty profile, it is important to consider both income and non-income dimensions of poverty. Income poverty is a common measure of the household well-being used by governments, donor agencies and other groups. A poverty line is normally established as the amount of money required to purchase sufficient food plus other basic household necessities. In Cambodia, for example, the poverty line is set at USD 0.50 per person per day. In Viet Nam, it is the level of expenditures required for each person to consume at least 2,100 calories per day.

Non-income dimensions of poverty are also very important. They measure different aspects of the well-being of a household and its members. Some of the most important and widely-recognised non-income dimensions of poverty include:

1. Location in flood-prone areas. Poor people are more likely to be living in low-lying, flood-prone areas where one finds the most vulnerable and lowest value land.
2. Landlessness or lack of secure land tenure of productive land. In rural areas of the LMB, households that do not have agricultural or other productive land most often must rely on their labour to generate income. The lack of secure tenure to productive land reduces the incentive to invest in improving agricultural productivity and, therefore, the well-being of the household.
3. Low education and/or literacy levels, particularly among the household head. Women and men who have little education and/or cannot read and write are often unable to participate in activities such as training or community affairs. For both men and women, low education can be related to low levels of job skills that limit access to social advancement.
4. Low health status that may be the result of lack of access to safe drinking water, high malnutrition rates or, among women, poor reproductive health. Poor health undermines individual productive capacity. High health costs reduce the money available for food and other household expenditures. The cost of medical care is a common reason that people sell land and other productive assets, increasing the risks of landlessness.
5. High proportion of children and other dependents in the household. High fertility means that there is less adult labour to contribute to meeting household needs. Working adults must produce enough to support the dependents as well as themselves or children need to contribute their labour.
6. Lack of access to markets. At a community level, the inability of people to reach markets to sell agricultural produce and other goods can reduce their opportunities to generate cash income to meet household needs. Related to this, communities that do not have year-round road or other transport access are sometimes at risk of higher levels of some kinds of poverty than more accessible communities, though they may have other long-term advantages by being insulated from outside influences or forms of exploitation and competition that roads often bring.

5.2.6 Ethnic profiles

The Asian Development Bank (ADB) defines minority ethnic groups as “those with a social or cultural identity distinct from the dominant or mainstream society, which makes them vulnerable to being disadvantaged in the processes of development.” Minority ethnic groups may have social, economic and other livelihood customs and conditions that differ significantly

from those of the majority ethnic group in or outside the project area, and that contribute to greater difficulties to benefit from FRM measures and/or greater risks of being adversely affected and facing loss of their culture and rights. Though they may be from the majority ethnic group, rural communities may also have cultural identities distinct from the country's urban decision-makers and can also be disadvantaged or vulnerable to the 'processes of development'.

Throughout much of the lowlands of the LMB, most people living in these areas are considered as belonging to the majority or dominant ethnic group in each country though many retain specific community attachments or earlier ethnic identities. Other ethnic groups living in these areas share many of the same livelihoods and living conditions. However, in Cambodia, the Cham are more likely than the Khmer to earn their livelihood from fishing; in the Mekong Delta in Viet Nam, ethnic Khmer are less likely than Kinh households to be involved in shrimp farming. Minority ethnic groups tend to live in upland areas in the LMB countries. Traditionally, many of these groups cultivated upland rice. They tend to rely on harvesting non-timber forest products such as wild herbs, medicines and building materials; and, they often have sacred sites located in forests and other areas near their communities.

In general, the major mainstream floods in the LMB will have little or no impacts on minority ethnic groups, though any projects on mainstream rivers that change their environments or call for their relocation may endanger them as distinct peoples. Flash floods in upland areas and combined floods in some localities will affect communities that include many – even a majority of – minority ethnic groups. The socio-economic profile should clearly document the available information on different ethnic groups in the FRM project area and also indicate whether or not sustainable development planning for minority and established communities is or is not being done to professional standards, as a check on the existence of general protections and planning. The information collected should be organised to indicate clearly any difference in livelihoods and living conditions, the basis of identity, and threats to cultural integrity. As with issues of poverty, it may be useful in certain areas where there are minority ethnic groups, to organise Focal Groups to know more about their livelihoods and their needs for protecting their integrity as peoples.

5.3 Land acquisition, compensation and resettlement

The location and design of the FRM measure may require the acquisition of land. As a consequence, individuals, households and communities may lose productive or other types of land, as well the crops, trees, structures and other assets located on the land. It may also require the relocation of housing, businesses and other activities. In the event of land acquisition, an important social strategy for the FRM project will be the preparation of a Resettlement Plan (RP) that documents (i) who is affected and how, (ii) what their rights and entitlements are to compensation and other assistance in terms of international and local laws and (iii) what are the different components of planning, implementing and monitoring the land acquisition process. .

There are several handbooks that provide detailed guidelines for the preparation of a RP as has been conducted by international financial institutions. They are examples of current practices by organisations that have financed projects that have involved resettlement. The following can be downloaded from the internet: (i) Handbook on Resettlement, A Guide to Good Practice, published by the Asian Development Bank (ADB, 19984); and (ii) Handbook for Preparing a Resettlement Plan, published by the International Finance Corporation (IFC, 2002 5). Given the

[4] www.adb.org/Documents/Handbooks/Resettlement/default.asp
[5] www.ifc.org/ifcext/sustainability.nsf/AttachmentsByTitle/p_resettle/$FILE/ ResettlementHandbook.PDF

complications and legal and cultural questions involved in these processes, this section will provide only guidance for the assessment of the land acquisition requirements in the IFRM planning process.

At the very beginning of work on planning and design of the FRM project, a field survey should be conducted to make an initial assessment of land acquisition requirements and alternatives, including identification of (i) the location, types and areas of land that are affected, as well as (ii) affected assets on this land. This assessment should be conducted for all potential project alternatives.

The evaluation and choice of a preferred project alternative should include, as a key criterion, the land acquisition requirements, namely:

1. Is there a viable project alternative that does not require the acquisition of land, damage to or loss of crops, structures and other assets and/or the displacement of people and businesses?
2. How can the location and design of the project be modified to avoid or minimise the need to acquire land?

For the preferred project alternative, the field survey should produce an initial estimate of:

1. types and amount of land to be acquired;
2. the number of people, households, businesses or institutions that are affected by land acquisition; and
3. whether it will be necessary to displace anyone or any activity.

This assessment should be used to determine what personnel, time and other resources will be needed to carry out the detailed assessment and prepare a RP.

5.4 Institutional capacity assessment

The primary responsibility for the social assessment of a FRM project lies with government agencies, particularly at the provincial level. At the same time, the involvement of a wide variety of stakeholders is necessary to establish a participatory approach and, in many instances, to facilitate the identification of issues and impacts and to implement the measures to address them. This includes local governments (districts, communes), NGOs and community-based organisations. Therefore, it is important to conduct an institutional capacity assessment of the relevant institutional stakeholders and their accountability to the primary stakeholders as part of the project preparation process. The results of this assessment can also identify requirements for training and capacity building, to assure efficient long-term management and local ownership and transparency, particularly with reference to provincial and local governments.

5.5 Social management plan

A social management plan (SMP) describes actions that are required to mitigate and manage adverse social impacts of the FRM project and, as well, to enhance and equitably distribute the benefits that arise from the improved flood risk management. It is closely related to and often integrated into the environmental management plan that is part of the EIA process (see Section 4.3.11).

In general the SMP includes four types of sub-plans geared to social protections, gender protections, cultural protections and transitional support:

Social action plan

A social action plan should follow an assessment of social and socio-economic impacts of the FRM project. It should describe the mechanisms, strategies and components that need to be included in the project design to avoid or reduce adverse impacts. It should also describe strategies to help primary stakeholders to fully share in the benefits of the FRM measures.

Gender action plan

A gender analysis should indicate whether and in what ways it may be necessary to strengthen the design and implementation of the FRM project to ensure equitable benefits for both men and women. A gender action plan is similar to a social action plan.

Specific actions for vulnerable groups

In the event that there are potentially significant impacts on poor households, minority ethnic group sustainability and equity or other vulnerable groups or they require special assistance to benefit from the FRM project, it may be necessary to (i) design specific actions that are integrated into the social and/or gender action plans or (ii) prepare a separate action plan to protect these interests. These actions and/or plans should include specific indicators to measure progress towards the objectives of the plans.

Training and capacity building program

An institutional capacity assessment should provide information on needs for training and capacity building for different government agencies and other organisations that will be involved in different aspects of the EIA, social assessment, consultation and land acquisition activities for the FRM project. It should begin with a clear analysis of why those capacities do not currently exist, noting what specific institutional structures have failed, and targeting changes at those institutional structures rather than simply throwing resources at ‘training’ or ‘capacity building’ that will be at risk, or that will be used as a form of public relations to hide the lack of effective local public ownership and control.

CHAPTER 6

PRACTICES FOR ECONOMIC VALUATION

6 PRACTICES FOR ECONOMIC VALUATION

6.1 Introduction

The economic analysis of flood damage reduction and development projects should follow the international practice for economic project analysis of comparing both benefits and costs on a 'with-project versus without-project' basis, thereby including the autonomous developments (both positive and negative trends) of the 'without-project' situation and the flood damage reduction and development potential of each envisaged project intervention and its various alternatives.

This chapter presents the economic calculations by describing 'net benefits' (Section 6.2) and 'costs' (expenditures and externalities) (Section 6.3) and then comparing them through a 'cost-benefit analysis' (Section 6.4).

6.2 Net benefits

A project's overall benefits (calculating impact benefits together with losses) may be in some four categories: reduction of flood damages, changes to land, changes to fish and soil, and environmental changes. These four categories are as follows:

1. ***Reduction of direct and indirect flood damages***

Project measures designed to change the flood hazard in the project area may change the pattern of damages for floods of different probabilities. This can be shown graphically on a new damage-probability curve and the curves, themselves, can be used to estimate the total damages before and after the changes; thus offering a measure of the benefits. The reduction in annual flood damages can be measured as the total area between the damage probability curves without the project intervention and the new damage probability curved with the project intervention.

is The flood protection level that a project offers can usually be measured in terms of the specific floods of certain floodwater levels that are prevented (e.g., if embankments are raised) For example, if the embankment for flood protection is designed to prevent the high floods that occur once every 50 years or more (the 50 year return period, equivalent to a probability of 2%), the potential annual flood damage reduction can be showed as the area under the damage probability curve between the 2% and 100% probability:

$$\text{Annual flood reduction}_{p=2\%} = \int_{2\%}^{100\%} Fx.dx$$

This is shown on the curves in Figure 6-1. Here, the lower curve, shown in red, is the damage-probability function. On this figure, the damages are really positive numbers even though the y-axis is below the x-axis. This picture just flips the y-axis in a mirror image. The blue line curve uses the same x-axis but shows flood water levels here as the y-axis. Note that this curve is different from similar curves that show "return periods". Here, the floods of the highest return periods are those that have the lowest probabilities and are closest to the intersection with the y-axis (where the probability gets closer to zero). On this curve, the smaller is the probability, the more unusual the type of flood and the higher the damages.

On this chart, the area shaded in red on the lower curve estimates the savings for a project that protects against the small floods. Those floods, that have high probability and previously caused damage, will no longer cause damage with the new protections. The area to the left of the 2% probability shows where the damages will still occur.

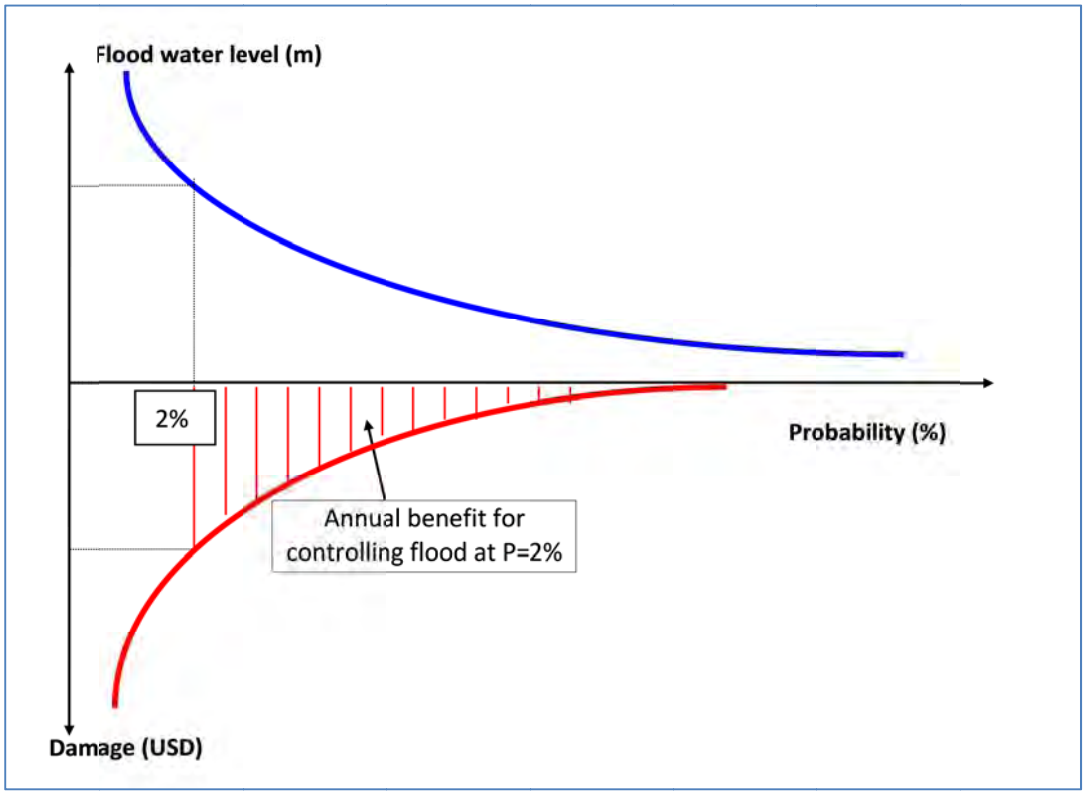


Figure 6-1 Flood damage probability curve and potential flood reduction.

2. ***Increase of net benefits resulting from the envisaged change in land use***

By delaying flooding in areas which are presently unprotected or by providing full flood control, protection measures (dykes, gates, drainage canals, irrigation) may change land-use patterns. For example, such measures might lead to a second, third, or even a fourth planting and harvest. Resulting changes in planting and yields offer a benefit which may be even more significant than the reduction of flood damages.

3. ***Reduction of natural fish and soil fertility (negatives)***

Reduced flooding will have impacts on fish stocks and soil that reduce the benefits that they bring and these can also be measured. Protection measures may have negative impacts on natural fish stocks due to a reduction in flooded area and flooding period. Moreover, flooding (i) provides annual silt to farmland; (ii) cleans toxins from farmland; (iii) improves soil texture and kills pests. Large floods usually increase crop yields for Winter-Spring paddy rice (November-March), particularly in Viet Nam's Mekong River Delta.

These losses in natural fish and soil fertility can be estimated using field surveys, Focal Group discussions with local residents and secondary information/documents. Though these and other losses or benefits may be difficult to measure, they are essential in calculating benefits of FRM.

4. ***Environmental and social benefits***

   There are many other potential categories of benefits from projects. For example, there may be reductions in transport cost due to road protection, changes in economic activity due to improvement in access roads, and so on.

   Beside these tangible benefits, there may also be intangible benefits such as new job opportunities or health improvements.

6.3 Costs

In most project analyses, identification of costs is much easier than identifying benefits. As presented here, the costs of project consist of several expenditure items for the project as well as the 'externalities' (negative impacts) that are beyond those negative impacts on soil and fishing that were presented above. These include:

1. ***Project structures cost.*** These expenditures are for the costs of the project infrastructure for flood control, for embankments or dykes, dams, gates, irrigation facilities and/or drainage pumping stations.

2. ***Labour costs.*** The labour expenditures in construction and operations can be estimated based on either the shadow price of labour (economic analysis) or the market rate (financial analysis). The shadow wage rate of labour reflects the level of un-employment. The higher the un-employment rate is, the bigger the differences between shadow and market rates, since unemployment drives wages down as people compete with each other for work and survival.

3. ***Direct resettlement costs.*** When people are forcibly removed to complete a project, projects must pay compensation for land and property, compensate for loss of income and for other losses to communities. Land valuation can reflect the economic cost (in terms of the benefits that people on the land derive throughout their lives and then in transfer to their heirs) or the financial (market) cost. Compensation for a demolished structure/house is usually at a replacement cost. It can be tricky to estimate the value of a house based on age by using construction costs.

4. ***Survey and design costs***. This category includes all expenditures for surveying (topography, geology and social economic) planning and design including project design documentation and proposed investment planning.

5. ***Supporting programme costs.*** Some project investors believe that there are measurable benefits in supporting local authorities with training or funds to manage aspects of projects that go beyond their normal activities or capacities. These costs are considered part of the 'support programme'. Some clear examples of such funding are grants to research organisations and extension services where there are new opportunities for crop diversification or new cultivation on changed soils.

6. ***Externalities***. Flood control measures may have negative impacts upstream and downstream of the protected areas by changing water and soil circulation and the environment. Some of these impacts can be analysis using hydraulic modelling. These costs are considered as project costs and in some cases could even outweigh benefits.

7. ***Operation and maintenance costs.*** After construction of project infrastructure, operation and maintenance costs are part of the on-going expenditures of a project. All the costs

associated with operation and maintenance need to be taken into account in a cost-benefit analysis and include, among other expenditures, salary and administrative costs and yearly maintenance costs of the system.

8. ***Replacement equipment costs***. A project may purchase mechanical equipment such as gates or pumping stations. These items have finite lives and need to be replaced on a regular basis. The cost analysis has to consider the schedule for replacement equipment costs.

6.4 Cost-benefit analysis

Cost-Benefit Analysis (CBA) is a process of comparing in common monetary units all the gains and losses resulting from specific actions to determine which one provides the most 'economic value', though not necessarily the most sustainable or 'best' choice. The fundamental principle in the CBA is to compare effects of a development intervention to those that will occur without it in pure monetary terms. The analysis should follow the international best practice for economic project analysis which is available in economic text books[6] and on website of ADB[7]. The following economic principles should be kept in mind during evaluation of cost and benefit of the project.

1. ***Economic price of good and services***: While the goal of economic analysis is to measure flood damages from the viewpoint of the society as a whole, this is extremely difficult given that different groups have different values. Traditional economists try to define a 'value' by looking at what is bought and sold in the marketplace, but these prices also distort values (they represent the values of those who have the resources/power to purchase and those who are put in the position of selling) and are not available for things not commonly sold in the market. To try to designate the market prices, traditional economists use what are called the economic and 'shadow prices' of good and services or the 'opportunity cost' (economic costs of not following an option) in estimating flood damages, additional benefits and project cost (the approach and some of the drawbacks are presented in Volume 3A of this series).

2. ***Discounting technique***: In economic analysis an economist compares the value of money at different times to reflect changes over time and beliefs and preferences over time. To do this the economist uses discounting technique for converting value of money to a specific time/date (this is also described more fully in Volume 3A).

3. ***Constant price***: In preparing a project statement that includes streams of future benefits and cost, prices from past and future years need to be standardised. A constant price approach is essential for combining all future costs and benefits (see Volume 3A for a full explanation).

4. ***'With project' and 'without project' concept***: The concept of "with and without" a project is used instead of a "before and after" approach due to the fact that trends that occur over time need to be taken into account for comparisons. By comparing benefits and costs on a 'With-project minus Without-project' basis, these autonomous developments (both positive and negative trends) are considered. Moreover, the "with and without" principle is also very useful in determining which changes need to be fully evaluated in CBA and which can be ignored. If the level of a particular resource is the same in with and without project cases, then there is no need to analyse it.

[6] J. Price Gittinger, Economic Analysis of Agricultural Projects, Johns Hopkins, 1982.
[7] http://www.adb.org/Documents/Guidelines/Eco_Analysis/default.asp

6.4.1 Cost-benefit analysis for flood control project

The principle of cost-benefit analysis requires that a project generate an increase in overall value; i.e., the benefits generated by the project should exceed the costs of the project. The following economic calculations, among others, are used in performing cost-benefit analysis. (See Volume 3A of this series for more detail.)

1. ***Net Present Value.*** The Net present value (NPV) or net present worth (NPW) is defined as the total present value (PV) of a series of financial flows over time. It is a standard method for using the 'time value of money' to appraise long-term projects. The approach, recognising its drawbacks, is used for capital budgeting by investors, and widely throughout the discipline of economics. NPV converts monetary values over time using what economists call the 'opportunity cost of capital' in a process of 'discounting' (assuming that people prefer to consume today and need to be paid to save). If the economic NPV is positive, economists consider a project to be feasible from an overall economic perspective. If it is zero or negative (resulting in a loss), it is considered unfeasible.

2. ***Internal Rate of Return.*** The internal rate of return (IRR) measures the amount of benefit a project produces compared to its investment costs and compared to the costs of borrowing the same amount of money from a bank and having to pay interest. Generally speaking, the higher a project's internal rate of return (IRR), the more desirable it is to undertake the project. As such, IRR can be used to rank several prospective projects and/or alternatives. Assuming all other factors are equal among the various projects, the project with the highest IRR would probably be considered the best and undertaken first. The IRR is sometimes referred to as "economic rate of return (ERR)". If the IRR is greater than the cost of capitol, the project is economically feasible. If the IRR is equal to the cut-off rate, the project is at a 'break even' level. And If the IRR is less than the cut-off rate, the project is not economic feasibility.

3. ***Cost Benefit Ratio (CBR).*** This is an indicator used in cost-benefit analysis that attempts to summarise the overall value of a project or proposal. The BCR is the ratio of the benefits of a project or proposal, expressed in monetary terms, relative to its costs, also expressed in monetary terms. All benefits and costs should be expressed in discounted present values prior to calculating the ratio. A project is economic feasible, at break even or not economically feasible if the BCR is greater than 1, equal to 1 or less than 1, respectively.

4. ***Net benefit-Investment Ratio.*** Like the BCR, the net benefit to capital investment ratio (N/K) ratio is a performance measure used to evaluate the efficiency of an investment or to compare the efficiency of a number of different investments. To calculate the N/K, the net benefit of an investment should be divided by the total investment. The result is expressed as a percentage or a ratio. The N/K ratio should be equal or greater than 1 to consider project as break even or economically feasible.

Advantages and disadvantages of the measures

Since the NPV, IRR, CBR and N/K use the same information and discounting techniques, one would expect that these measures would yield the same conclusions on which projects should be adopted and which should be rejected [*John B. Loomis 1993*]. The measures all point in the same directions but where they differ is in their usefulness for comparisons.

The Net Present Value

This measure has a scale dimension. The bigger size of the project, the higher NPV of the project is. Therefore, it is difficult to compare economic efficiency between projects having different size by using the NPV. One must look at rations instead, like the IRR.

The Internal Rate of Return

The IRR can be described as the potential interest rate that a project can pay for the use of resources. It is an easy measure to understand. It is unaffected by the scale of the project, that one can compare IRR among projects regardless their size.

The Cost-Benefit Ratio

This measure is expressed as how many dollars can be gained from each dollar of investment. It is easy to understand. One can compare BCRs among projects regardless of their size.

Criteria Used for Selecting a Project

Projects are considered feasible if they demonstrate a net present value of zero or greater, an internal rate of return equal to or above the cost of capital, or a cost-benefit ratio or net benefit-investment ratio of 1 or greater.

However, projects often compete for funds among other projects that may be feasible if a project has high IRR but low NPV (due to its small size) and there is no opportunity to find any other project to couple with it, economists might propose selecting other larger projects which have a lower IRR but higher NPV and consume all the funds available.

6.4.2 Benefit cost analysis for the optimum flood protection level

Economists have sought to offer an optimisation model for FRM using mathematical techniques. The approach combines 'risk cost reduction' with 'capital costs' to find the optimum level of protection.

1. **Risk reduction curve**

Risk is the cost of not providing a level of flood protection. The risk is computed as an expected value by the integral of the flood damage probability curve simply given as Fx (a function of the value on the x axis) as shown in a below formula. The risk reduction owing to flood protection infrastructure is the difference between the present risk and the estimated risk for flood protection plan at a specific protection level of P= p_1, p_2, p_3 etc. Each protection level will have a specific cost and a specific graph, but the shape of the curve is the same for each since the curves are based on the same overall flood damage curve, before accounting for the protection cost.

Risk reduction at protection level P = $\int_{P\%}^{100\%} Fx.dx$

A risk reduction curve uses the expected values of the damage curves of different flood protection levels or return periods of flood protection infrastructure plans. The risk reduction means the benefit owing to flood control infrastructure construction.

Below is an example taken from the Tam Nong Focal Area in Dong Thap Province, Viet Nam, the flood hazard was analysed using the 97-years of hydrological data from 1910-2006 and generated a damage probability curve. Flood risk reduction was then calculated directly using the damage probability curve. See Table 6-1, Figure 6-2 and Figure 6-3.

In Table 6-1, 'P' is the probability of a flood of a certain size and is the inverse of the return period 'T'. Flood damages are either actual data or interpolated data from the plotted curve using the historical data. The risk reduction is calculated for the Demonstration Project on Flood Protection Criteria for the Mekong Delta, Vietnam as part of FMMP Component 2. The data on the table is then directly plotted in Figure 6-3 and Figure 6-4.

Table 6-1 Flood damage and risk reduction.

P (%)	T (Year)	Flood damage (M USD/yr)	Risk reduction (M USD/yr)	P (%)	T (Year)	Flood damage (M USD/yr)	Risk reduction (M USD/yr)
1.0%	98.0	14.84	2.606	26.5%	3.8	4.47	0.485
2.0%	49.0	13.44	2.454	27.6%	3.6	3.97	0.440
3.1%	32.7	12.91	2.317	28.6%	3.5	3.90	0.399
4.1%	24.5	11.89	2.185	29.6%	3.4	3.86	0.359
5.1%	19.6	11.68	2.064	30.6%	3.3	3.86	0.320
6.1%	16.3	11.59	1.945	31.6%	3.2	2.94	0.281
7.1%	14.0	10.87	1.827	32.7%	3.1	2.91	0.251
8.2%	12.3	10.35	1.716	33.7%	3.0	2.85	0.221
9.2%	10.9	10.33	1.610	34.7%	2.9	2.81	0.192
10.2%	9.8	8.53	1.505	35.7%	2.8	2.65	0.163
11.2%	8.9	7.70	1.418	36.7%	2.7	2.26	0.136
12.2%	8.2	7.35	1.339	37.8%	2.6	2.08	0.113
13.3%	7.5	7.18	1.264	38.8%	2.6	1.99	0.092
14.3%	7.0	7.17	1.191	39.8%	2.5	1.50	0.072
15.3%	6.5	7.00	1.118	40.8%	2.5	1.31	0.056
16.3%	6.1	6.99	1.046	41.8%	2.4	0.98	0.043
17.3%	5.8	6.71	0.975	42.9%	2.3	0.74	0.033
18.4%	5.4	6.42	0.906	43.9%	2.3	0.59	0.025
19.4%	5.2	5.62	0.841	44.9%	2.2	0.56	0.019
20.4%	4.9	5.42	0.783	45.9%	2.2	0.40	0.014
21.4%	4.7	5.20	0.728	46.9%	2.1	0.36	0.010
22.4%	4.5	4.80	0.675	48.0%	2.1	0.19	0.006
23.5%	4.3	4.68	0.626	49.0%	2.0	0.11	0.004
24.5%	4.1	4.63	0.578	50.0%	2.0	0.07	0.003
25.5%	3.9	4.49	0.531				

Source: Tam Nong focal area, Dong Thap Province, Viet Nam

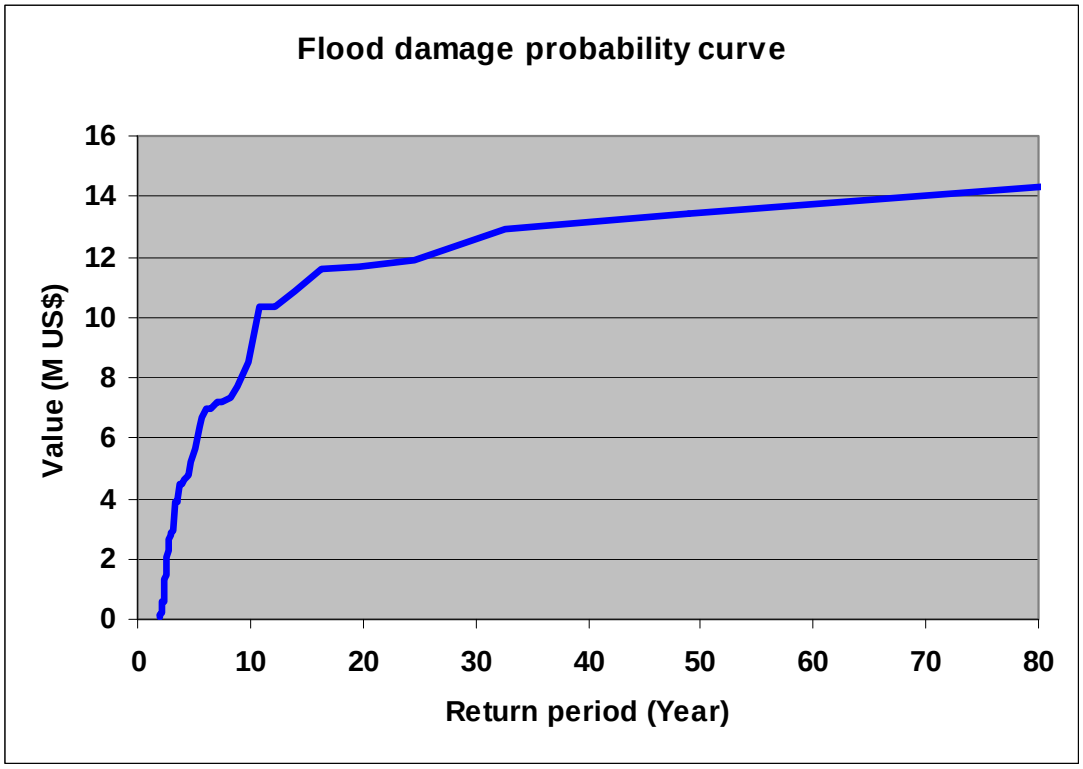


Figure 6-2 Flood damage probability curve using data from the Tam Nong Focal Area.

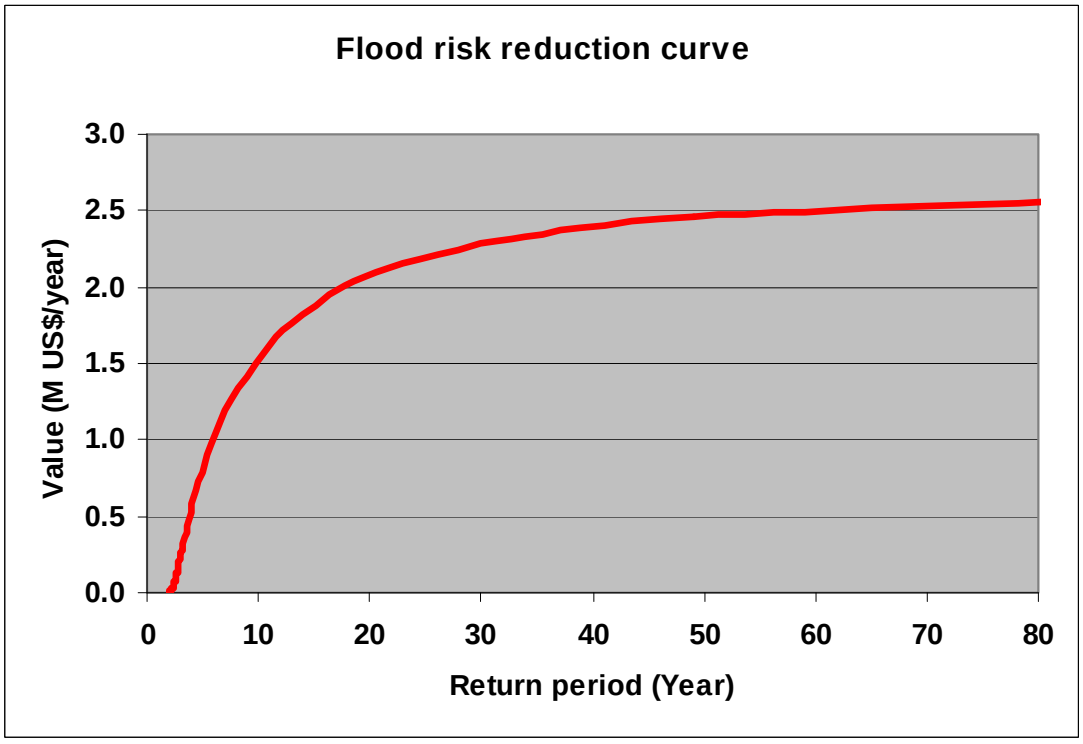


Figure 6-3 Flood risk reduction curve using data from the Tam Nong Focal Area.

2. **Capital-cost curve**

The total cost for flood control infrastructure is the sum of the initial construction and labour costs (the capital cost), the maintenance cost and replacement costs. The initial cost or capital cost usually occurs over four or five years during construction. The operations and maintenance

costs are annual expenditures to keep the infrastructure running properly as designed. The replacement costs for mechanical equipment (gates, pumps, etc.) occur in different periods. All these costs can be expressed on an annual basis to estimate the total present value of costs. The actual amount per year is a stream of costs that can be calculated (such as in Table 6-2 which shows the three different types of costs and then sums them as a 'cash flow total'. Note that Table 6-2 doesn't use real numbers but just labels for the different costs and that it shows comparisons of two different projects with levels of flood control at two different flood probabilities). The amount can be translated into an overall present value of the costs. Then, if there is an estimate for the expected life of the whole project, it is possible to calculate the 'averaged' annual cost. This averaged annual capital cost ('annuity') of a project offering a certain flood protection level can be calculated by the formula below. In the formula, 'A' is an annual capital cost, PV is present value of the capital cost; i is the discount rate; and n is the number of years considered in the economic analysis of the project, which could be 25 to 40 years.

$$A = PV\frac{i(1+i)^n}{(1+i)^n - 1}$$

The capital cost curve is a relation between capital costs and potential flood control projects to achieve flood control at different levels (i.e., stopping floods of certain frequencies or probability levels.) of the flood control infrastructure plan. Figure 6-5 offers an example of such a curve generated from data of different projects with protection against floods ranging in annual probabilities from 1% to 50%.

Table 6-2 Standard table format for estimating annual capital cost.

Year	Flood protection at P1%				Flood protection at P2%			
	Invest. Cost	O&M Cost	Repl. Cost	Cash-flow total	Invest. Cost	O&M Cost	Repl. Cost	Cash-flow total
1	I-1.1			C-1.1	I-2.1			C-2.1
2	I-1.2			C-1.2	I-2.2			C-2.2
3	I-1.3			C-1.3	I-2.3			C-2.3
4	I-1.4	M-1.4		C-1.4	I-2.4	M-2.4		C-2.4
.....	.....	.....	.....	.....	.....	.....	.....	.....
15		M-1.15	R-1.15	C-1.15		M-2.15	R-2.15	C-2.15
.....	.....	.....	.....	.....	.....	.....	.....	.....
30		M-1.30		C-1.30		M-2.30		C-2.30
				NP-1				NP-2
				A-1				A-2

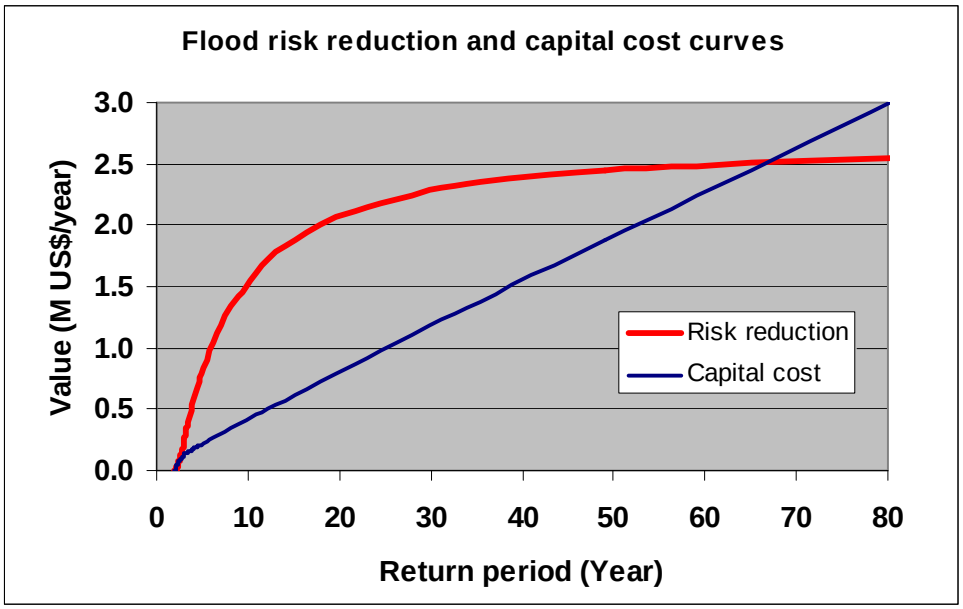


Figure 6-4 Flood risk reduction and capital cost curves.

3. **Optimal flood protection level**

The cost-benefit comparison equations can be used to determine the optimal flood protection levels of flood control infrastructure. Combining the Risk-Cost Reduction Curve with the Capital-Cost Curve yields the Cost-Benefit Curve, as shown in Figure 6-5.

The flood protection level (return period) having the maximum value of Benefits minus Costs (on the graph it is shown as the point at about the 18 to 21 year return period, with a value of about $1.3 Million) is determined as the optimal flood protection level. Note, however, that any flood control project is economically feasible when its benefits exceed its costs. In Figure 6.5, it appears that any of the flood control options between the 2 year and 65 year return periods offer possible benefits.

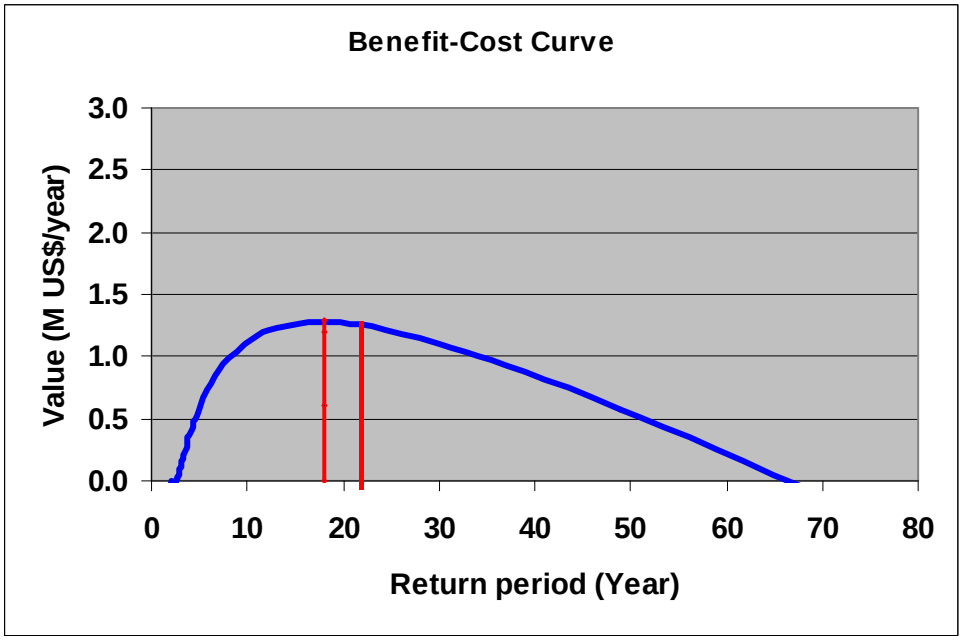


Figure 6-5 Cost-Benefit curve and optimum flood protection level.

CHAPTER 7

REFERENCES

7 REFERENCES

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APPENDICES

Appendix 1 Participatory Tools Selection Matrix

This matrix is offered as a tool to help in selecting ad-hoc participatory methods based on cost, time and suitability. It can be used by planners, top-down, and partly by communities in demands for public participation to protect established rights and interests and to widen the scope of public participation and governmental accountability.

Participation tools	Participation objective (Awareness and Education, Input Solicitation, Public decision-making)	Effectiveness inn achieving the objective	Efficiency: Time/cost commitment, staff skill and capacity	Equity: Equal participation of all communities and individuals in the decision-making, with due process and rights protections									

Appendix 2 Stakeholder Analysis Matrix

Stakeholder Name / Group	Directly affected (Y/N)	Proximity to the project area	How impacted (Positively/Negatively)	Contact person for the stakeholder type/group	Contact information

Appendix 3 Guiding Questions - Stakeholders' Consultation

These are basis, sample questions to be asked of stakeholders with a focus on economic implications of certain flood infrastructure.

1. How many people live in this area and what is their ethnic identification, their social status, and other demographic characteristics?

2. What are the livelihoods opportunities in the area?

a. Fishing b. Agriculture c. labour d. others (describe)

3. When do the floods occur and how serious are they for people and assets?

4. How serious are the floods that affect only agricultural land?

5. Which flood management structures are you aware of in your area?

6. How closely have you been involved with any flood control study?

7. If a new flood control structure such as construction of dykes along the river, diversion of flood water with controlled gates is to be constructed in your area, how will it impact you?

8. If these structural measures do not directly impact you, which other people will be directly affected?

9. If the structural flood protection measure is aiming at early flood protection and thereby, creating opportunity for growing two crops, how would you adapt to this change?

10. If the structural flood protection measure seeks full flood protection and creates an opportunity for growing three crops, how would you adapt to this change?

11. What type of support from the Government or private sector do you foresee if the change means growing two or three crops instead of one or two crops in a year?

12. Will these structural measures affect fishing activities? If yes, what does it mean for your livelihood?

13. If the structural measures do not affect your fishing activities directly, which other people will be directly affected?

14. In your view, what are the options available for flood control or better coping with the floods?

15. What type of development do you want to see in your area?

Appendix 4 Sample Stakeholder Participation Plan For Structural Flood Protection Measures

Secondary Stakeholder Groups (Institutional Representation)

Involved in project preparation exercise: Project implementing agency National and provincial line agencies Contractors Provincial governments	*For consultation:* Local governments (province, district, commune) Village leaders, village members Community-based organisations (Farmers' groups, Water-User Groups, Conservation / Forest User Groups) Civil society organisations or mass organisations (e.g., Women's Union)

Project type	**Structural Flood Protection Measures**		
Stages	**Activities**	**Events**	**Resource required**
	During Stage 2: Demonstration Phase		
1. Project Conceptualisation:	1.1 Prepare a clear fact sheet describing the project, its expected location and coverage, and the estimated costs. The language and terminology used in the description should be accessible to those people who will be affected by the project. Provide information on who to contact to learn more about the project. 1.2 Conduct stakeholder analysis with project implementing agency, line agencies (national and provincial), and local governments to determine which ethnic groups, communities, household, and settlements will be most affected by the project, and identify vulnerable groups and to situate the project in sustainable development planning. 1.3 Distribute the fact sheet in the affected area as widely as possible through leaflets, and posting in community spaces. 1.4 Organise a public information session open to all to inform the community about the project and answer questions. 1.5 At the public information session, collect contact information from those who consider themselves affected or inform them of how to notify the project that they wish to attend future consultations. 1.6 Map out the communities to be consulted on the design, based on most affected settlements, and seek representation from different geographic/ethnic areas that will be affected. 1.7 Assess the important characteristics of communities in the target area that must be considered in assessments and consultations. These will include: ▪ Language and cultural practices for community decision-making ▪ Opportunities and constraints to women's participation in planning ▪ Potential sources of conflict / competition for resources that need to be considered in the participatory process.	Stakeholder inception workshop Public information session	International Public Participation (PP) Specialist trained in sociology, anthropology and public interest group advocacy. National SS Specialist Leaflets / Information posters Workshop and travel costs.

Project type	Structural Flood Protection Measures		
Stages	**Activities**	**Events**	**Resource required**
During Stage 2: Demonstration Phase			
2. Project Design: Assessment	2.1 Identify key NMC and/or Project Executing Agency personnel or Sub-contractors (Mass organisations / NGOs) who can be trained to lead consultation and planning exercises in communes and villages. This group will be the Community Facilitators 2.2 Conduct a rapid training needs assessment of the Community Facilitators. 2.3 Adapt sets of participatory development and social tools relevant to structural project design preparations. These tools include: ▪ Participatory Hazard, Vulnerability and Capacity Assessment, including assessing negative and positive impacts of flooding, traditional coping mechanisms, and needs for external support in flood protection and disaster management. ▪ Participatory Rural Appraisal Tools for mapping land use and community resources and assets, historical changes, ▪ Social Assessment: Key informant interviews and Focus Groups with affected populations to contribute to assessment of social impacts on: land-use, forest use, water use, gender roles, and ethnic group sustainability following professional ethical protocols for protecting vulnerable individuals and groups. 2.4 Establish a format for summarising information from the consultations for use by the Project Executing Agency in the design process. 2.5 Conduct a Training of Community Facilitators. ▪ Day 1 of the training should include an Introduction to design of Structural Flood Protection Works in the LMB ▪ Day 2 - 3: Training on tools and facilitation skills for participatory planning, including a practicum in one of the communities within the potential project area.		International Public Participation Specialist National SS Specialist

Project type	Structural Flood Protection Measures		
Stages	**Activities**	**Events**	**Resource required**
During Stage 2: Demonstration Phase			
3. Project Design: Analysis of Impacts and Mitigation	3.1 Based on mapping (from step 1.6, above) Community Facilitators conduct consultations, focus groups sessions and key informational interviews in targeted localities with support from the National Social Survey specialist. 3.2 Identify one person (e.g., the leader of a community-based organisation) in each settlement area to be a focal point for continued feedback on the design and progress of the project. 3.3 Hold debriefing session with the National SS Specialist and Community Facilitators (CF) at the mid-way point between consultations to review the quality of information collection and summarisation. 3.4 Complete the consultations and document the potential social impacts and community priorities for flood protection / livelihood impacts and community inputs on how to mitigate negative impacts of the proposed project. 3.5 Incorporate information from the communities in finalising the project design or in decisions on whether to proceed with the project or alternate approach. If the project is to go ahead, develop options for full compensation of negative impacts of the project as well as to support communities in taking full advantage of project benefits (e.g., diversifying crops with flood protection; developing alternatives to agricultural production in areas of potentially increased flooding). 3.6 Design culturally protective resettlement plans and full, enforceable and monitored land compensation consistent with the highest standard among international legal protections, government, and donor or investor regulations. 3.7 Hold community consultations to either i) validate the options that will be included in the project design for compensation or ii) select among the options according to community priorities and rights-based protections. Whether the purpose is validation or selection will depend on the nature of the project and the flow of resources to compensate those affected. 3.8 Identify other support in the community (other projects, NGOs, government programs) that can support communities in asserting and protecting their rights to mitigate negative impacts or take full advantage of positive impacts of changes brought by the project. 3.9 Identify existing community-based organisations (Water User Groups, Mass Organisations, Co-operatives, Disaster Management Committees) that could play a role in Operation and Maintenance of project structures.		International Public Participation Specialist National SS to supervise the CF and assist in compilation of results. CFs : Travel allowances Travel costs Workshop and meeting costs

Project type	Structural Flood Protection Measures		
Stages	**Activities**	**Events**	**Resource required**
During Stage 2: Demonstration Phase			
4. Dissemination of Public Participation Practice in other NMCs	4.1 Review and refine the public participation process and tools based on the experience of National SS and International PP. 4.2 Conduct an experience sharing workshop / training on Public Participation in each country by a National SS Spec. (the workshop can also be held at the regional level). 4.3 Finalise Public Participation Toolkit and document of recommendations for its future use in project design.	Experience Sharing Workshop	International PP Specialist National SS Specialist
During full implementation of Structural Measure			
5. Project Implementation and Monitoring	Prepare detailed public participation steps for the implementation of structural projects based on the specific type of project, location, and following guidelines on Public Participation, and Environmental, Economic and Social Impact. The important steps in this process are : 5.1 Disseminate information about the project's final design, ground-breaking and progress through media, local broadcasts and other available communications. 5.2 Provide refresher training on facilitation skills to Community Facilitators to re-engage them in the process. 5.3 Mobilise existing or new Community-based organisations (Women's Union, Water User Groups, Farmer Groups) for participatory monitoring of project implementation. 5.4 Establish a checklist to monitor: ▪ Access routes, waste disposal, uses of land, and environmental impacts during construction; ▪ Quality of construction when appropriate; ▪ Negative impacts on land and natural resources as construction progresses; ▪ Implementation of compensation packages; and ▪ Implementation of resettlement. 5.5 Offer training through community facilitators on project design oversight and community monitoring activities. 5.6 Establish feedback mechanism with the Project Executing Agency, Contractors, and the relevant Government Authority to address problems during construction, or to adjust designs for unanticipated negative impacts. 5.7 Establish an enforceable legal oversight mechanism for reporting and resolving problems related to resettlement and compensation packages.	Press releases, Press conferences Workshops with stakeholder groups Community monitoring meetings	International Public Participation Specialist National Social Sector / Public Participation Specialists Allowances for Community Facilitators Travel costs Workshop and meeting costs

Project type	Structural Flood Protection Measures		
Stages	**Activities**	**Events**	**Resource required**
	During full implementation of Structural Measure		
6. Project Implementation: Operation and Maintenance	6.1 Provide training on Operations and Maintenance (O & M) to the final Project owner/manager (local government, line agency, etc.). 6.2 Identify in the training how the community can be involved in the Operation and Maintenance, depending on the type of structural work, size, location and anticipated maintenance requirements. 6.3 Based on information from consultations, work with the Project owner/manager to form community O & M groups. 6.4 Provide training and support to Operation and Maintenance groups on legal, administrative and financial controls and oversight (statutes of operation, schemes to recover costs of maintenance where appropriate, financial support for operations) depending on the type of structure. 6.5 Prepare materials and organise community meetings on what community members should or should not do to contribute to maintenance of the structure.	Training on O & M - for Community Facilitators / Project owners/ managers - for community	

Appendix 5 Screening Check List of Environmental, Economic and Social Impacts

SCREENING QUESTION	Yes	No	Remark
A. PROJECT SITING **IS THE PROJECT AREA ADJACENT TO OR WITHIN ANY OF THE FOLLOWING ENVIRONMENTALLY SENSITIVE AREAS?**			
– in or near sensitive and valuable ecosystems (e.g., protected areas, wetlands, wilderness lands, coral reefs, and habitats of endangered species)?			
– in or near areas with cultural heritage sites (e.g. archaeological, historical sites or existing cultural or sacred sites)?			
– densely populated areas where resettlement may be required or pollution impacts and other disturbances may be significant?			
– regions subject to heavy industrial or commercial activities or where there are conflicts in natural resource allocation?			
– watercourses, aquifer recharge areas, or reservoir catchments used for potable water supplies?			
– lands or waters containing valuable resources (e.g., fisheries, minerals, medicinal plants, prime agricultural soils)?			
B. POTENTIAL ENVIRONMENTAL IMPACTS IS THE PROJECT LIKELY TO LEAD TO:			
– permanent transformation of potentially productive or valuable resources (e.g. fisheries, natural forests, wilderness lands)?			
– destruction of natural habitat and loss of biodiversity or environmental services provided by a natural system?			
– risk to human health and safety (e.g., from the generation, storage, or disposal of hazardous wastes, inappropriate occupational health and safety measures, or violation of ambient water or air quality standards)?			
– encroachment on lands or rights of indigenous peoples or other vulnerable minorities?			
– displacement of large numbers of people or businesses? –			
– ineffective mitigation or weak and/or unenforceable compensation measures?			

Appendix 6 Parameter Summary List of Environmental, Economic and Social Impacts

CHECKLIST OF ENVIRONMENTAL, ECONOMIC AND SOCIAL PARAMETERS FOR FLOOD RISK MANAGEMENT PROJECTS

		Environmental Concerns		Related Impacts		Recommended Feasible Mitigation Measures	No Significant Impact	Significant Impact		
								Small	Moderate	Major
A	**Environmental concerns related to project sitting**									
	1	Land acquisition.	1	Loss of productive land and/or sources of income. Displacement of households, and/or economic activities. Social/ community disruption.	1	Avoid or minimise by careful design. If not possible, compensate for losses and provide assistance to relocate and/or restore living conditions/ livelihoods/culture. Prepare and implement participatory Resettlement Plan.				
	2	Encroachment on and/or damage to historical, cultural, religious or other sites and monuments that are important to the community and/or to social groups.	2	Loss of valued sites. Disruption of social/ community rituals. *Indirect impacts*: Loss of tourism potential/income.	2	Avoid, minimise or offset activities by careful design and consultation with local communities and anthropologists. Compensate for damage to or displacement of sites, graves, etc.				
	3	Encroachment into or restricted access to forest/swamplands/wetlands.	3	Loss of biodiversity, rare and endangered species. Loss of forest/swamp/wetland related production functions. *Indirect impacts*: Increased household expenditures for food, building materials, medicines, etc., that were harvested. Reduced strategies to deal with food shortages. Increased risks of poverty.	3	Avoid or minimise by careful design and consultation with local communities. Compensate and/or offset economic losses through replacement of resources, identification of alternative income sources, etc.				

CHECKLIST OF ENVIRONMENTAL, ECONOMIC AND SOCIAL PARAMETERS FOR FLOOD RISK MANAGEMENT PROJECTS									
Environmental Concerns			Related Impacts		Recommended Feasible Mitigation Measures		No Significant Impact	Significant Impact		
								Small	Moderate	Major
A	**Environmental concerns related to project sitting**									
	4	Loss of agricultural/aquaculture land.	4	Loss of household income from sales and/or work as hired labour (with different impacts for men and women, landless HH). Loss of business revenues and wage employment (commercial agriculture, agro- and fish processing, etc.) *Indirect impacts*: Increased HH expenditures for food; reduced food security. Distress sales of land and other assets. Increased risk of out-migration to look for work. Increased poverty.	4	Consultation with affected communities and HH to identify and implement feasible alternative income sources. Training for new job skills, establishment of micro-enterprises. Compensation for economic losses.				
	5	Impediments to natural migrations and movements of wildlife, including obstruction of fish migration paths.	5	Impediment of wildlife, reduction in biodiversity and fish stocks. *Indirect impacts*: Loss of income from fishing.	5	Careful planning, design, and operation, construction of fish migratory passages.				
	6	Impediment to movements of people (e.g., navigation) and their animals.	6	Disruption of economic activities and transportation.	6	Careful planning and design.				
	7	Loss of aesthetic, visual or recreational value of the areas.	7	Loss of precious values, economic losses.	7	Careful planning and design.				

CHECKLIST OF ENVIRONMENTAL, ECONOMIC AND SOCIAL PARAMETERS FOR FLOOD RISK MANAGEMENT PROJECTS										
Environmental Concerns			Related Impacts		Recommended Feasible Mitigation Measures		No Significant Impact	Significant Impact		
								Small	Moderate	Major
B	**Environmental concerns related to project implementation and construction activities**									
	1	Soil erosion.	1	Water quality impact, loss of productive soil, sedimentation problems. *Indirect impacts*: Reduced drinking water quality; higher agricultural input costs/ reduced productivity and incomes.	1	Minimise clearing activities, limit activities to dry season, optimise soil cover and apply soil management techniques to minimise soil loss.				
	2	Increased turbidity in rivers and water courses.	2	Impact on flora and fauna, sedimentation problems. *Indirect impacts*: Reduced drinking water quality (stream/rivers and water supply systems).	2	Apply fencing, use silt screens in sensitive areas.				
	3	Sedimentation of river beds.	3	Loss of habitat, problems with navigation *Indirect impacts*: Temporary restrictions on navigation/accessibility for economic activities, social networks.	3	Remove deposited sediments.				
	4	Loss of habitats.	4	Loss of biodiversity, reduction in fish stocks. *Indirect impacts*: Reduced incomes from fishing/fish processing (differential impacts on men and women); reduced food security.	4	Careful planning and design of disposal sites.				
	5	Loss of soil fertility.	5	Loss of agricultural production, *Indirect impacts*: Loss of income (potential differential impacts on men and women); reduced food security; increased poverty risks.	5	Careful planning and design of soil movement, set aside fertile topsoil. Supply fertilisers.				

CHECKLIST OF ENVIRONMENTAL, ECONOMIC AND SOCIAL PARAMETERS FOR FLOOD RISK MANAGEMENT PROJECTS										
Environmental Concerns			Related Impacts		Recommended Feasible Mitigation Measures		No Significant Impact	Significant Impact		
								Small	Moderate	Major
B	**Environmental concerns related to project implementation and construction activities**									
	6	Worker accidents.	6	Health impacts, economic losses due to injuries, loss of life; increased public health care costs.	6	Implement safe working practices through training, site supervision and provision of safety equipment.				
	7	Traffic accidents.	7	Health impacts, economic losses due to injuries, loss of life; increased public health care costs.	7	Identify alternative routes, limit and post driving speeds. Provide community awareness programs.				
	8	Disruption of access to productive land (e.g., farm land, fishing areas, forests) and/or to community facilities/services.	8	Temporary loss of income from farming, fishing and processing activities (differential impacts on men and women); Reduced food security; Temporary disruption of local businesses, business income, wage income for employees; Temporary disruption of community services (e.g. access to clinics).	8	Identify alternative routes to facilitate continued access; limit disruptions to periods of low economic activity, e.g. outside harvest periods; Compensate for loss of business income and employee wages; Assist to temporarily relocate community facilities/services to maintain access.				
	9	Obstruction to navigation.	9	Temporary restricted access and/or extra costs for transport related to economic activities; restricted fishing activities, Temporary restricted and/or more expensive transport to support social network.	9	Identify alternative routes, limit to periods of low economic activity, e.g. outside main fishing periods.				
	10	Disruption of utility services.	10	Temporary disruption and/or extra costs for local businesses, economic activities (e.g. agricultural processing) and community facilities/services (e.g. health clinics).	10	Careful planning and quick repair in case of accidents. Provide community awareness and information programs.				

CHECKLIST OF ENVIRONMENTAL, ECONOMIC AND SOCIAL PARAMETERS FOR FLOOD RISK MANAGEMENT PROJECTS										
Environmental Concerns			Related Impacts		Recommended Feasible Mitigation Measures		No Significant Impact	Significant Impact		
								Small	Moderate	Major
B	**Environmental concerns related to project implementation and construction activities**									
	11	Noise/vibration/air pollution.	11	Temporary reduced living conditions (dust, noise); temporary increased risks of health impacts (e.g., due to dust).	11	Limit working hours in populated areas, use proper and well maintained equipment.				
	12	Soil/water contamination related to leakage and inappropriate storage of fuels and other chemicals, dumping of construction wastes or improper sanitation.	12	Loss of flora and fauna. Increased risks of health problems, e.g., skin rashes/eye infections from contaminated surface water, cuts, abrasions, etc., from unsafe dumping of construction wastes. Contamination of drinking water sources with related health risks (diarrhoea, dysentery).	12	Containment of fuels stored on-site and off-site refuelling, follow appropriate procedures, proper maintenance of equipment, collection and proper handling of construction wastes, provision of proper sanitation facilities.				
	13	Groundwater pollution related to leakage and inappropriate storage of fuels and other chemicals, dumping of construction wastes or improper sanitation.	13	Contamination of drinking water sources with related health risks (diarrhoea, dysentery).	13	Containment of fuels stored on-site and off-site refuelling, follow appropriate procedures, proper maintenance of equipment, collection and proper handling of construction wastes, provision of proper sanitation facilities.				
	14	Influx of non-local workers for project construction and others attracted by economic opportunities	14	Social tensions due to competition for paid work and other economic opportunities related to FRM project, inappropriate behaviour of non-residents, lack of knowledge/respect for local customs.	14	Contractor contracts specify: (i) employment of local workers; (ii) local purchase of goods and services; (iii) awareness programs on local customs and appropriate behaviour.				

CHECKLIST OF ENVIRONMENTAL, ECONOMIC AND SOCIAL PARAMETERS FOR FLOOD RISK MANAGEMENT PROJECTS										
Environmental Concerns			Related Impacts		Recommended Feasible Mitigation Measures		No Significant Impact	Significant Impact		
								Small	Moderate	Major
B	**Environmental concerns related to project implementation and construction activities**									
	15	Health impacts/disease hazards due to influx of workers and other non-residents.	15	Increased risks of sexually transmitted diseases including HIV/AIDS, increased risks of other infectious diseases.	15	Contractor contracts specify robust HIV/AIDS awareness and prevention program targeting workers and people in surrounding communities. Plan proper domestic and human waste management. Support local health clinics to meet new demands.				
	16	Pressure on water supply and sanitation due to influx of workers.	16	Increased health risks related to poor drinking water and sanitation conditions (diarrhoea, dysentery), Possible loss of business income due to lack of adequate water supply/sanitation.	16	Appropriate planning and design of water supply and sanitation facilities, including supplementary resources. Plan proper domestic and human waste management; Support for local health clinics to meet new demands.				
	17	Employment opportunities for residents.	17	Short-term poverty reduction, improved short-term welfare.	17	Contractor contracts specify: (i) employment of local workers; (ii) local purchase of goods and services; (iii) awareness programs on local customs and appropriate behaviour.				

CHECKLIST OF ENVIRONMENTAL, ECONOMIC AND SOCIAL PARAMETERS FOR FLOOD RISK MANAGEMENT PROJECTS										
Environmental Concerns			**Related Impacts**		**Recommended Feasible Mitigation Measures**		**No Significant Impact**	**Significant Impact**		
								Small	**Moderate**	**Major**
B	**Environmental concerns related to project implementation and construction activities**									
	15	Health impacts/disease hazards due to influx of workers and other non-residents.	15	Increased risks of sexually transmitted diseases including HIV/AIDS, increased risks of other infectious diseases.	15	Contractor contracts specify robust HIV/AIDS awareness and prevention program targeting workers and people in surrounding communities. Plan proper domestic and human waste management. Support local health clinics to meet new demands.				
	16	Pressure on water supply and sanitation due to influx of workers.	16	Increased health risks related to poor drinking water and sanitation conditions (diarrhoea, dysentery), Possible loss of business income due to lack of adequate water supply/sanitation.	16	Appropriate planning and design of water supply and sanitation facilities, including supplementary resources. Plan proper domestic and human waste management; Support for local health clinics to meet new demands.				
	17	Employment opportunities for residents.	17	Short-term poverty reduction, improved short-term welfare.	17	Contractor contracts specify: (i) employment of local workers; (ii) local purchase of goods and services; (iii) awareness programs on local customs and appropriate behaviour.				

CHECKLIST OF ENVIRONMENTAL, ECONOMIC AND SOCIAL PARAMETERS FOR FLOOD RISK MANAGEMENT PROJECTS										
Environmental Concerns			Related Impacts		Recommended Feasible Mitigation Measures		No Significant Impact	Significant Impact		
								Small	Moderate	Major
C	**Environmental concerns related to project design, management, operation and maintenance**									
		Project induced changes in hydrology/hydraulics: the timing, extent, depth and duration of flooding, resulting in:								
	1	Loss of agricultural production (loss of flood benefits).		Increased input costs and reduced yields; loss of business revenue and household incomes; possible loss of jobs for agricultural workers. *Indirect impacts*: reduced food security, increased incidence of distress sales of land and other assets, increased incidence of out-migration to look for work, increased poverty risks.		Allow sufficient flooding to safeguard silt and water supply and control pests. Strengthen and provide agricultural extension and other technical assistance to enhance agricultural productivity, diversify crop production, expand livestock raising, etc. (including services targeting men's and women's agricultural activities).				
	2	Loss of capture fisheries production (loss of flood benefits).		Loss of household incomes I*ndirect impacts*: reduced food security, increased poverty risks.		Allow sufficient flooding to maintain fish migration patterns and fish spawning, breeding, nursing and feeding areas.				
	3	Loss of wetland area/productivity (loss of flood benefits).		Ecological impacts; loss of biodiversity. Economic losses (loss of income, extra expenditures), decreased food security, increased poverty risks.		Allow sufficient flooding to safeguard silt and water supply.				
	4	Hindrance to navigation/transport by boat (loss of flood benefits).		Economic losses due to reduced accessibility and/or higher transport costs for businesses, marketing and other economic activities. Social impacts due to reduced mobility/ travel to maintain social networks.		Allow water levels high enough to make navigation possible.				

CHECKLIST OF ENVIRONMENTAL, ECONOMIC AND SOCIAL PARAMETERS FOR FLOOD RISK MANAGEMENT PROJECTS										
Environmental Concerns			Related Impacts		Recommended Feasible Mitigation Measures		No Significant Impact	Significant Impact		
								Small	Moderate	Major
C	**Environmental concerns related to project design, management, operation and maintenance**									
	5	Reduced water availability in the dry season (loss of flood benefits).		Economic losses due to lack of water for agriculture, other economic activities. Social and health impacts due to lack of safe drinking water; decreased food security, increased poverty.		Allow sufficient flooding to safeguard replenishment of groundwater and surface water storage.				
	6	Changes in river morphology.		Economic losses due to hindrance to navigation, impacts on sand mining industry.		Dredging, construction of bank protection works.				
	7	Changes in salt water intrusion.		Damage to agriculture and aquaculture; loss of business revenue and household incomes; potential loss of jobs for agricultural/aquaculture workers.		Maintain minimum flows.				
	8	Decline in delta growth from accumulation of sediment.		Reduction in economic opportunities due to decline in land accretion.		Maintain minimum (sediment carrying) flows.				
D	**Positive impacts related to project design, management, operation and maintenance**									
	1	Increased safety.		Improved well-being, reduced short-term poverty.						
	2	Improved sanitation and health.		Improved well-being, reduced short-term poverty.						
	3	Decreased flood damage.		Improved well-being, reduced short-term poverty, improved food security.						
	4	Increased agricultural production.		Improved well-being, reduced short-term poverty, improved food security.						
	5	Improved mobility/transportation networks.		Social and economic welfare, reduced short-term poverty.						
	6	Short-term poverty reduction/improved short-term food security.		Improved well-being in the short-term.						

Appendix 7 Best Practice Designated Guidelines and Project Phases/Stages

In order to facilitate management of an engineering project, project managers normally divide projects into phases such as the following five phases:

1. Initiation;
2. Planning/ Development/ Design;
3. Production/ Implementation;
4. Monitoring/ Control;
5. Closure.

A project starts with an idea to solve or mitigate a problem, create a product or structure or some other objective. In the initiation phase, finances are mobilised, a project team is formed, equipment and tools are purchased, and the idea begins to take shape. The second phase is the planning/ development/ design phase. The feasibility of the idea is tested, and, if successful, a project plan is produced and the design is prepared. In Phase 3, the plans and designs are implemented; production takes place and the project is underway. Monitoring during project implementation may reveal the need to correct the planning and/or design, and make adjustments. After completion, the project will be closed; the project team disbands, accounts are closed, and the product or result may be handed over to a client.

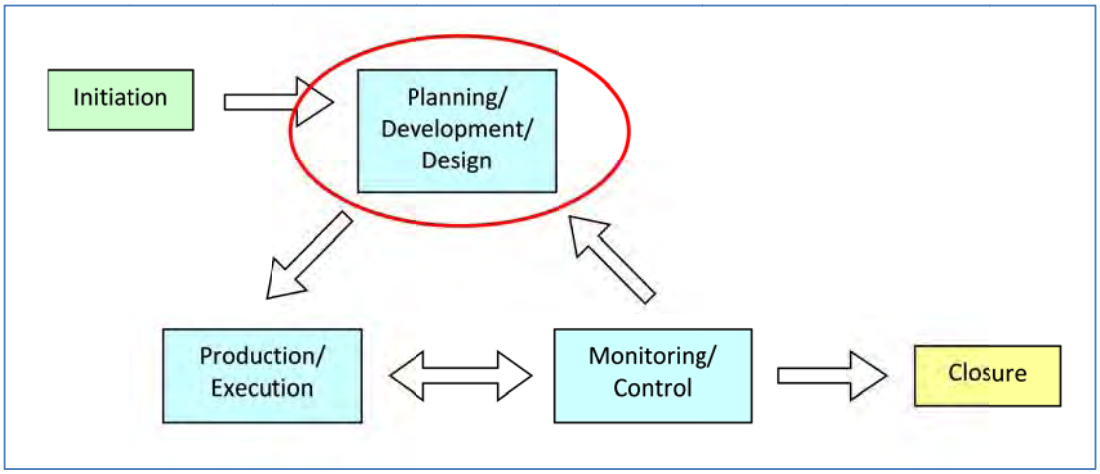


Figure 1 The phases of an engineering project.

The Best Practice Guidelines are almost exclusively applicable to Phase 2: Planning/ Development/Design. This phase can be subdivided in various stages, listed below.

a) Preliminary/pre-feasibility study;
b) Feasibility study and overall planning;
c) Preliminary design;
d) Detailed design and detailed planning;
e) Construction/bid documents.

The number and content of the stages may differ, depending mainly on project type or country-specific preferences. The preliminary design stage, for example, is often included in the feasibility study for engineering projects.

Each section of the guidelines applies to one or more of the above stages. In the guidelines this will be indicated by displaying symbols that represent each stage (shown below) in the page margins.

Phase 2 contains all of the following five stages:

a) Preliminary/ pre-feasibility study

A pre-feasibility study is the precursor to a feasibility and design study. Its main purpose is to decide whether it is worthwhile to proceed to the feasibility study stage and to ensure there is a sound basis for undertaking a feasibility study.

A pre-feasibility study generally includes:

- Definition of achievable project outcomes;
- Analysis of the development situation and constraints the project is to address, based on collected data;
- Identification of related (government and other stakeholders) policies, programs and activities;
- Preliminary assessment of the viability of alternative approaches; and
- Preliminary identification of likely risks to feasibility and benefits (including risks to sustainability).

b) Feasibility study and overall planning

If a project is considered to be feasible based on the pre-feasibility study, a more thorough feasibility study can begin. A feasibility study defines the project and its objectives in detail, and looks at these various forms of feasibility:

- Technical feasibility: Can the measures technically be realised in the local context?
- Operational feasibility: Are the measures to be implemented manageable by the local people?
- Economic feasibility: Is the cost-benefit analysis favourable?
- Social feasibility: Are the objectives and measures socially acceptable?
- Environmental feasibility: Are the environmental impacts acceptable?
- Political feasibility: Will the measures be supported by those with power?
- Overall feasibility: Will implementation of the envisaged measures result in accomplishment of the project objectives?

Field surveys, hydrological and hydraulic analyses (in flood mitigation projects), social and environmental assessments, stakeholder meetings, and costs estimates are among the basis for answering the above questions. If the answers are positive, the operations/ management structure and management method can be defined, and any initial planning can be detailed.

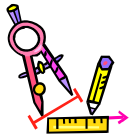
c) Preliminary design

If a project is deemed feasible, the preliminary design stage can start. This stage focuses on the technical measures, as follows:

- Site surveys and investigations and computer modelling provide the data for preliminary design criteria;
- The design criteria can be translated into the preliminary design of structures and measures in an integrated and balanced system in which the envisaged management activities are linked to one another;
- The cost-benefit analysis (construction and operation) and analysis of environmental, social and political factors demonstrate whether the project is still viable.

If necessary, the project planning can be adjusted based on new insights gained in this stage.

d) Detailed design and detailed planning



During the final design stage the detailed architectural and engineering drawings (the blueprints) of all physical components of the project are produced. Virtually all design problems must have been resolved before the end of the final design stage. Sufficient detail must be provided by the drawings and the report to allow reasonably accurate estimates of construction and operating costs, as well as the construction scheduling.

e) Construction documents/bid documents

The detailed designs and construction scheduling are incorporated in construction documents and bid specifications, giving the contractors the information they need for construction.

Where sections of the guidelines refer to other than the above-described stages (e.g. the construction or monitoring phase), the following symbol is used:

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