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TRAINING MANUAL

Mekong River Commission

Manual for Training Trainers in Integrated Water Resources Management in the Mekong Basin

October 2011

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Acronyms

ADB	Asian Development Bank
BAT	Best Available Technology
BATNEEC	Best Available Technology Not Involving Excessive Costs
BDP	Basin Development Programme (MRC)
BPT	Best Practicable Technology
CA	Comprehensive Assessment of Water Management in Agriculture
CIA	Cumulative Impact Assessment
CNMC	Cambodia National Mekong Committee
DSS	Decision Support System
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
FP	Fisheries Programme (MRC)
GIS	Geographic Information Systems
GWP	Global Water Partnership
IWMI	International Water Management Institute
IWRM	Integrated Water Resources Management
LMB	Lower Mekong Basin
LNMC	Lao National Mekong Committee
M&E	Monitoring and Evaluation
MCM	Million cubic metres
MNRE	Ministry of Natural Resources and Environment (Thailand)
MONRE	Ministry of Natural Resources and Environment (Viet Nam)
MOWRAM	Ministry of Water Resources and Meteorology (Cambodia)
MRC	Mekong River Commission
MRCS	Mekong River Commission Secretariat
MSP	Multi-Stakeholder Platform
NGO	Non-Governmental Organisation
NMC	National Mekong Committee
NWRC	National Water Resources Council
PSP	Private Sector Participation
RBC	River Basin Management Committee
SA	Social Assessment
SEA	Strategic Environmental Assessment
SIA	Social Impact Assessment
TAB	Technical Advisory Board
VNMC	Viet Nam National Mekong Committee
WFC	World Fish Centre
WRA	Water Resources Assessment
WREA	Water Resources and Environment Administration (Lao PDR)
WWF	World Wide Fund for Nature

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- **Global Water Partnership** for use of: *Integrated Water Resources Management: IWRM at a Glance.*
- **Mekong River Commission** for use of:
  - *Towards an IWRM-based Basin Development Strategy for the Lower Mekong Basin* (Working Paper (version 2) 24 April, 2009; and
  - *Approach to BDP2 Sub-area Activities*. Version 2: February 23, 2009 (in preparation)
- **UNESCO IHP/WWAP/NARBO** for use of: *IWRM Guidelines at River Basin Level*.

All other sources are referred to herein and are acknowledged.

Introduction to the Training Manual

1. Background and Aims of the Training of Trainers programme

This Training Manual supported a 10 day training activity in integrated river basin planning for the Mekong River Commission, in October 2009. The Manual can be adjusted for different lengths of Training Sessions (see Annex 1). The activity originated as a component of both the Integrated Capacity Building Programme and the Basin Development Plan Programme Phase 2 of the MRC.

The development of a Training Manual and the Training of Trainers programme on IWRM is critical to achieving the objectives of both cross-cutting programmes and in building IWRM capacity amongst MRCS, NMCs and line agencies at national and sub-basin levels. It is also important that these new skills are internalised within the MRC for effective basin development planning and that master trainers from each MRC Member country have the knowledge and skills to work closely with national BDP units to adapt the Training Manual and training programme at the national and sub-area activity levels.

The Training of Trainers programme aims to:

- **To produce a Training Manual** (this document and supporting materials) that combines the introduction of latest concepts and good practices for integrated water resources management and the knowledge and skills to apply BDP specific planning guides in carrying out Sub-area activities; and
- **To develop a group of about 5 master trainers for each Member country comprising of technical experts,** key members of Sub-area working groups and professional trainers from national training institutions. The master trainers will work closely with National BDP units to adapt the Training Manual, translate into riparian languages and deliver training courses for various local officials and stakeholders in the Sub-areas.

2. Purpose of this Training Manual

This Training Manual seeks to provide knowledge of and training in integrated water resources management (IWRM). This is done at both the basin level and in support of BDP sub-area activities, in line with the Guidelines for BDP sub-area activities. The Training Manual is designed to be adapted to riparian languages and will be used for national training courses, organized by National BDP units with support from national research institutions in the future.

3. How the Training Manual was developed

This Manual was developed using resources from several existing IWRM training manuals which are listed in Appendix 6 of this Manual. Some sections of this Manual draw directly from the GWP IWRM toolbox (www.gwptoolbox.org) and the support of the Global Water Partnership to use this material is acknowledged. The material in this Manual was tested in a 'trial training' programme in Lao PDR (24-28 August, 2009) and comments received were uses to adapt the training material and approach based on participants' experience.

Throughout the book you'll find these icons to help guide you.

4. Overview of the content of the Manual

This Manual contains nine chapters and several annexes. In each chapter, there are session plans referred to in the chapter and provided at the end of each chapter. The nine chapters are:

Chapter 1 Starting a Training Programme

Chapter 2 Introduction to Integrated Water Resources Management

Chapter 3 The Enabling Environment

Chapter 4 Institutional Roles

Chapter 5 Management Tools: Participation, Stakeholder Engagement and Conflict Management

Chapter 6 Management Tools: IWRM Planning

Chapter 7 Management Tools: Monitoring and Water Information

Chapter 8 Management tools: Impact Assessments

Chapter 9 Basic Training Skills and Knowledge

The annexes contain information on training techniques and other resources.

5. Approach used to train Master Trainers

The approach used in this programme to achieve capable, trained trainers in IWRM includes:

- **Building on and enhancing past learning**.
- **Building and maintaining ownership** within the MRC, NMCs and Line Agencies.
- **Enhancing technical expertise** in IWRM, particularly at the national BDP unit level and sub-area activity levels.
- **Enhancing capacity in adult education principles and practices** including building capacity to design, deliver and evaluate participatory, learner centred training programmes based adult education principles and processes.
- **Matching new knowledge and skills** with problem solving mechanisms and effective communication
- **Scaling out and down** by mainstreaming IWRM approaches and tools, to adapt and mainstream IWRM approaches and tools at the national and sub-national levels for greater internalization and application at these levels.
- **Continuous improvement** through learning by doing: using an iterative approach to testing, reflecting and adapting where participatory M&E processes will be used to guide and inform our response. This is particularly important in developing and recommending implementation guidelines and a robust M&E framework to the MRC for the assessment of progress and outcomes of IWRM at the national and sub-national levels.
- **Building and maintaining strong links** with other MRC projects, programmes and partners.

6. How to use this Manual

Each chapter can be used as a standalone training document but users should ensure Chapters 1 and 2 are completed first.

This Training Manual seeks to provide knowledge of and support the training in integrated river basin planning, based on integrated water resources management (IWRM). It was specifically designed to support an intensive Training of Trainers programme for approximately 20 Master Trainers who now have the responsibility to further adapt the material presented in this manual to the specific national context of their country and deliver IWRM training programmes for various local officials and stakeholders in the Lower Mekong Basin (including the MRC BDP sub-areas).

Focus Point

In adapting and preparing for delivery of IWRM programmes at the national level, what needs to be considered in adapting this manual?

Specific cultural related concepts

The training programme outlined in this manual is based upon adult learning principles, learning through openness, participation and constructive feedback, challenging participants through questions and periods of critical reflection, engaging various styles of learning including the use of energisers and games. The training approach advocated in this manual deliberately moves away from a reliance on 'experts' and formal lectures (but we do acknowledge their importance in certain circumstances), but we also appreciate that this may be met with resistance at the national level and even criticised as being a Western model of learning and therefore not applicable here in Asia.

In designing national level training programmes a balance needs to be found between 'traditional' and 'expected' styles of training and learning centred and participatory approaches based on adult learning principles. In finding this balance, please remember that many 'ancient' Asian philosophies (such as Buddhism and Confucianism) follow the same adult and experiential learning principles advocated in this manual.

Specific country contexts

The material presented in this manual will need to be reviewed and adapted to the national and sub-area context of the training programme to ensure that the material is immediately applicable to the participants – where ever possible bring in national and sub-area examples, case studies, data and stories to ensure the training is well 'grounded' in the local reality.

Specific English terminology

The terminology in this manual has been carefully considered, but there will be terms that are difficult to translate into the regional languages. When translating foreign terms:

1. Use words closest to the original meaning;
2. Make up new words and explain; or
3. Retain the original English term, but provide a description in your own language

Adapt the training material to your participants

Before any training commences it is important to understand the needs of the institutions supporting the training and individuals attending the training. The training needs analysis (TNA) completed by the MRC for Cambodia, Lao and Viet Nam[1] provides an excellent starting point when adapting your training. You should also access other organisational learning or capacity building strategies (if available) and other training documents, evaluation reports as well as interviewing possible participants and those responsible for managing the training programme to gain a much deeper insight in the participant's learning needs.

Consider:

- Changing material to relate to the specific regional context or supporting organisation of the target group
- Changing the level of language used to suit the target group
- Removing information or adding information to ensure it is current and accurate
- Modifying information to suit policy and regulatory frameworks
- Modifying information to use specific organisational policies and procedures as guidelines
- Adding information, activities and assessment methods specific to the learning programme
- Providing sources of further information-reading, websites, industry groups
- Changing the sequence of material
- Changing the context of generic material to relate to the learner's specific situation.

Simply taking the material from this manual will certainly be simple it will be unlikely to fit the specific needs of a new group of participants.

1. Visalsok, Touch (September 2008), Training Needs Assessment for the National Key Stakeholders of the Basin Development Programme in Cambodia, Cambodia National Mekong Committee.

AROUNLANGSY, Manilath (September 2008), Capacity Building and Training Needs Assessment for BDP for Lao PDR, Lao National Mekong Committee.

Cao Dat Khoa (June 2008), Capacity Building and Training Needs Assessment for BDP for Viet Nam, Viet Nam National Mekong Committee

Pre-training preparation by participants

It is always a tempting idea to ask participants to develop a presentation or case study on their work before the training commences and then have the participants present during the training. However, this can only work if clear instructions are provided, participants are given sufficient time to prepare, the task is not too difficult and the participant presentations are integrated into the training programme, participant presentations can be an excellent way to encourage participation, establish a sense of participant ownership in the training and introduce relevant and current case studies into the training programme.

If the above is not carried out, unfortunately outcomes of this exercise seldom meet expectations – generally quality between participant presentations varies considerably, the nominated or suggested topic are not covered, the presentations are (nearly always) too long, or some participants don't prepare anything.

Inviting resource people

Inviting resource people to present a number of key sessions is again a very tempting idea, particularly if you are not confident in a particular subject area. But some of the problems of participant presentations also apply to external resource people. The solution is similar – plan and prepare clear and concise instructions. It is also extremely helpful for the invited resource person to have an outline of the training and session learning objectives, a set of guiding questions and if possible participants' expectations of the session the resource person is invited to present at.

Chapter 1
Starting a Training Programme

1.1 Setting the training scene and context

One of the more important parts of your training programme will be the first morning when the scene is set, expectations are explored, tasks allocated and the atmosphere and training environment established. The success to which participants are made to feel comfortable, respected, included and relaxed will have ramifications for the remainder of your training.

As a very general guide, some of the key scenes setting activities are:

Welcome remarks:
- Make participants and facilitators feel at ease
- Make participants and facilitators feel accepted and welcomed
- Give overview of the workshop

Introductions:
- Ask participants and facilitators to introduce themselves, so everyone knows everyone else.
- Make interactions easy, so participants feel they are no longer strangers
- Help participants/facilitators become familiar with their environment.

Sharing Expectations:
- Help facilitators target (identify) issues that need immediate attention
- Discuss unexpected issues that arise, so that facilitators and participants understand one another and are on the same page
- Mould the workshop; allow facilitators and participants to redesign the workshop to address their expectations.

Goals & objectives:
- Direct the training
- Help participants and facilitators to evaluate the training themselves
- Solidify a routine for conducting sessions

Raising and exploring objectives and expectations:
- Match goals and objectives and agree on material to be covered in the workshop or training
- Individuals will assess whether their expectations are met during and after the workshop

Norms:
- Help to set a productive and orderly environment

Establishment of working groups (host team, time keepers, daily feedback teams, entertainment etc):
- Brings shared leadership
- Helps to keep focus
- Guides participants

Logistical issues:
- Clear some doubts and fears

>>> **See session plan 1.1: setting the training context to the training manual**

>>> **See session plan 1.2: getting to know each other – participant and trainer introductions**

>>> **See session plan 1.3: participant expectations**

Session Plan

1.2 Session Plan 1.1: Setting the training context

OBJECTIVES

At the end of this session the participants will be able to:

- Explain the training objectives and understand the importance of these objectives.
- Explain the flow and approach to the training programme.

MATERIALS

- Flip chart 1: Training objectives.
- Flip chart 2: Training schedule or training flow diagram.
- Handout: Training objectives and training schedule (may include details of field trip and exercise).

TIME

- 30 minutes

PREPARATION

- Write learning objectives for the training programme that are SMART (specific, measurable, achievable, realistic and time bound).
- Develop an appropriate training schedule (see three examples below)
- Develop a PowerPoint presentation that clearly outlines the training objectives, the training schedule and any important logistical issues.

STEPS

1. **Introduce the session** by explaining that the training objectives and training schedule will be reviewed. Encourage participants to ask questions during the presentation so that any misunderstandings on the training objectives, approach and schedule are dealt with early on in the training.

2. **Read through** each of the training objectives and briefly indicate why the objectives have been set and the importance of each.

3. **Present the training schedule**, clearly outlining start and end times as well as key breaks during the day. Get participants to read the schedule and seek questions or comments on the training schedule. Outline the participatory training approach by noting the various learning methods used during the training (these may be 'expert' presentations, small group work, case studies, simulations, field exercises and tours, etc).

   - Ask participants how much adults remember from hearing (20%), seeing and hearing (40%) and from experiencing (80%).

   - Emphasize that the training will use a range of training approaches, but will focus on interactive learning processes.

4. **Outline any logistical issues** that participants should be made aware of. This may include food, accommodation, transportation, financial issues, etc.
5. If there is to be a field study tour or participant presentations, **provide a very brief introduction to the objectives and logistical issues** associated with these events.

6. **Invite questions or comments from participants** to ensure that the training objectives, schedule and approach are clearly understood and that there are no outstanding issues.

Session Support Material

Training objectives:

- Training objectives need to be clearly written on a flip-chart and displayed throughout the training programme

Session Plan

1.3 Session Plan 1.2: Getting to Know Each Other – Participant and Trainer Introductions

OBJECTIVES

At the end of this session the participants will:

- Know more about other participants, the trainers and how they are involved in IWRM projects and programmes.
- Identified a number of examples where IWRM principles are being applied in the Lower Mekong Basin.
- List challenges to achieving IWRM in the Lower Mekong Basin.

MATERIALS

- Flip charts
- Marker pens

TIME

- 60 minutes (depending on number of participants).

PREPARATION

- Draw, on a flip chart, a site where good IWRM principles and practices are found. The trainer also needs to write down their name, organisation and 3 key challenges to IWRM. This will be used as an example to show the participants the type of output required.

STEPS

1. **Explain** that before we start the workshop, it would be nice to know about those participating in this training and how they are involved in IWRM processes and practices. Explain to participants that we will do this in an interactive and fun way by drawing a water resource map for a location that participants think illustrated good principles of IWRM.

2. **Hand out** to each participant a flip chart and coloured marker pens. Ask each participant to find a partner that she or he does not know.

3. Once pairs have been identified as **ask each participant to draw or map** an example that they thinks show the principles of IWRM.

4. Once the drawing or map has been completed each **participant needs to write down** their:
   - Name?
   - Organisation?
   - 3 key challenges to achieving IWRM?

5. Once the above tasks are completed, allow 10 minutes for each **participant to interview their partner** about their example and note down their name, organisation and the 3 key challenges.

6. Once each participant has finished interviewing their pair, **ask them to introduce their partner** one by one till all participants and trainers are introduced.

COMMENTS

- **The trainer should prepare an example map** prior to the training commencing; otherwise many participants may get confused as to the required output. This is especially so if participants are new to interactive and participatory ways of training.

- Once participants have completed their introductions, their **IWRM 'maps' should be hung on the training room walls** for days 1 and 2 of the training so that reference can be made back to the examples provided by the participants.

- If time is short for this session, the **drawing of a water resource map could be dropped** and participants just asked what they think the three key challenges to IWRM are. Other variations on this session are possible and the session should be adjusted to match the trainers and participants experience and time available.

Session Plan

1.4 Session Plan 1.3: participant expectations

OBJECTIVES

At the end of this session the participants will:

- Have clearly identified what they expect from the training and what they do not want (or do not expect) from the training.

MATERIALS

- Flip Chart
- Three to five index cards or post-it notes per person
- Marker pens

TIME

- 45 minutes (depending on number of participants)

PREPARATION

- Flip chart with 2 key questions:
  1. What do you WANT (expect) from the training; and
  2. What do you NOT WANT (expect) from the training

STEPS

1. **Introduce the session** by explaining that the training objectives have been outlined and these are the expectations of the trainers and the supporting organisations. But the participants might have very different expectations and it would be useful to explore these to ensure that the training matches their expectations.

2. **Post the flip chart in clear view of all participants** and get each participant to freely write down their responses to the following questions:
   - What do you WANT (expect) from the training? and
   - What do you NOT WANT (expect) from the training?

3. After five minutes, **form groups of 3 to 6** and get the group to cluster and summarize their responses to the two questions. Each group's response is to be clearly outlined on a flip chart.
   - Allow approximately 15 minutes for this group summary process.

4. Once the groups have finished this process **get each group to post their flip chart** on the training room walls.

5. Each group is then to **report their outcomes** back to the plenary.

6. The trainer should **briefly respond to each of the expectations** to ensure that the training will meet the participants' expectations. Where the training will not meet the participants' expectations, the trainer should outline why and how this expectation could be achieved through other channels.

COMMENTS

- During the group feedback, it is important for the trainer to clearly link participant expectations to specific sessions. It is therefore useful to have the training schedule clearly outlined during this feedback process so that these connections are made visually.
- This will illustrate to participants when and where their expectations will be met and will remind the trainer to refer to certain expectations during different sessions throughout the training course.
- The outcomes from this session should also be collected and stored so that they can be reviewed during the training evaluation to see if participant expectations had been met.

Session Plan

1.5 Session Plan 1.4: setting training 'norms'

OBJECTIVES

At the end of this session the participants:

- Will have agreed on guidelines for group functioning during the training.
- Will have formed small groups and been allocated days upon which they must lead the daily evaluation at the end of the day and daily review at the beginning of the next day.

MATERIALS

- Flip Chart

TIME

- 15 minutes

PREPARATION

- Flip chart 1: Suggested Training Norms

STEPS

1. **Explain** that as most participants (and the trainers) don't know each other very well, it is useful to agree on how we want to work together and that this agreement is quite important for the establishment of a good learning environment.

2. **Provide some examples** of training 'norms' or guidelines: Any question is a good one; No smoking in the room; turn off mobile phones.

3. Now show the prepared training norms/ guidelines and **ask participants to review and comment.** Ask participants if any further training norms are required, but make sure there is consensus before a new training norm is added to the list.

COMMENTS

- **If there is time,** the development of training Norms should be done in a participatory way so that ownership of the norms is developed by the entire group. Again break participants into groups of 4 to 6 and allow each of the groups to develop their own training norms. Once this has been completed each group should present and the trainer should summarize all group outcomes to develop a final list for participants to consider and abide by during the training.

Session Support Material

Suggested group norms

- Everyone has the right to know (meaning they can ask the trainers at any time why something is being done or said, and how it relates to the overall workshop aims).
- Any question is a good question.
- Practice what we are learning.
- Allow everyone to participate.
- Share responsibility for learning.
- Start and finish on time BUT accept flexibility in the schedule.
- No smoking in the training room.
- Switch off mobile phones (or turn mobile phones to silent mode).

Session Plan

1.6 Session Plan 1.5: Establishing Working Groups

OBJECTIVES

At the end of this session the participants:

- Will have formed small groups and been allocated tasks that need to be completed on a daily basis.

MATERIALS

- Flip Chart

TIME

- 20 minutes

PREPARATION

- Flip chart 1: Matrix of participants and Working Groups

STEPS

1. After introducing the training norms, **divide participants into working groups** to help with the some of the functions of the training. Below are some suggested working groups, but the training can be creative and think of other possible working groups:
    - Law enforcement group (set rules and regulations based on norms and small penalties when norms/ rules are broken).
    - Entertainment group (responsible for conducting an energizer after lunch or at an appropriate time during the training day. Annex One provides several simple and fun energisers.)
    - Reporting and Monitoring group (responsible for conducting a simple Monitoring and Evaluation (M&E) process at the end of the day and in the first session of the next morning, providing feedback an overview of the topics covered. Annex two provides some simple M&E tools.)
2. Make sure that **each working group has a different task** assigned to them each day.
3. **Seek clarification** that the participants understand which group they are in and the responsibilities and activities that they must undertake when assigned a particular working group.

COMMENTS

- The allocation of a Reporting and Monitoring Group (as a minimum) is a very useful exercise as it involves participants in the training process allowing the participants to take ownership of the training.
- The drawing up of the Working Group matrix and the allocation of working groups should be prepared before the training commences as this can be a time consuming and confusing process if done during the session.
- The working groups can work very well, however the trainer needs to work with each of the groups to ensure they know what their responsibilities are. Prepare a handout on simple M&E tools and energisers to encourage participants in these working groups. Also suggest a small fine if any group norms are broken, i.e. the buying of a bag of sweets.

Chapter 2
Introduction to Integrated Water Resources Management

2.1 What is IWRM and why do we need it?

The Global Water Partnership defines integrated water resources management as a process that "promotes the co-ordinated development and management of water, land and related resources, in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems".[2] What is integrated river basin planning? This is a subset of IWRM – it is IWRM at the basin scale. It involves procedures to plan the use and management of land and water resources in a coordinated manner across a river basin, and at the sub-basin level.

IWRM is needed to overcome the problem of single sector management: managing/using water for just one sector, say food production, or for just power production. IWRM coordinates water management across, between and within sectors. This is illustrated in the diagram below - the IWRM 'comb' – a handle to coordinate actions.

> "**Why is IWRM needed?** Water is a limited resource that is essential for economic growth and environmental and social well-being. Because it affects everyone, managing this precious resource requires balancing the interests of the many different user groups and individuals. Without that balance many conflicts can occur. Promoting coordinated water resources management in a basin that is open to all stakeholders will not only resolve such conflicts but will also bring enormous benefits to society, the basin, and to individual stakeholders."
>
> ***Gene Stakhiv*** *and* ***Shinsuke Ota,*** *Co-Chairs of the Steering Committee, IWRM Guidelines at River Basin Level, UNESCO (see resource list at the end of this manual).*

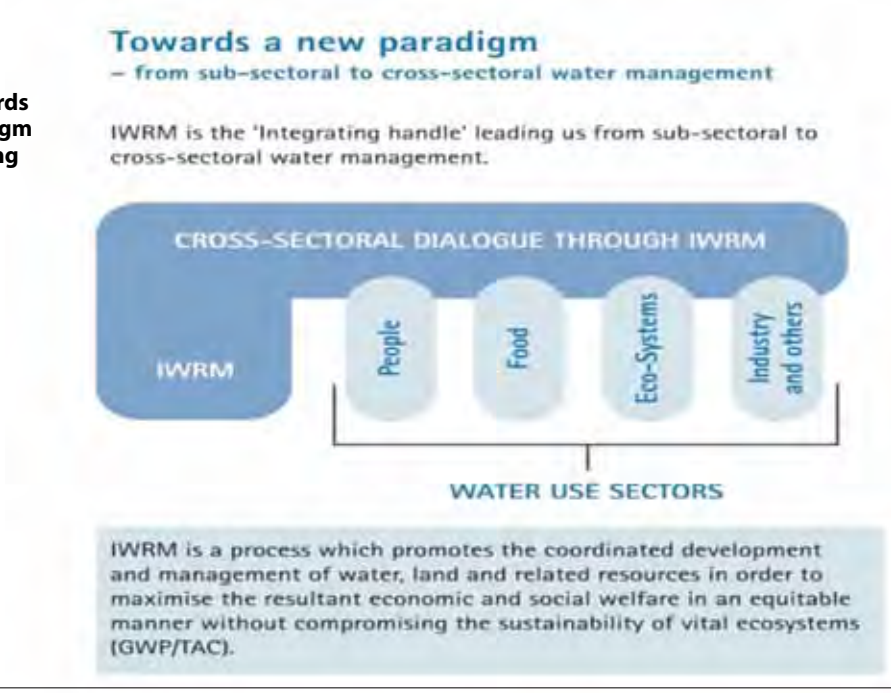


Figure 2.1 IWRM – Towards a new paradigm (a way of doing business)

2. GWP TAC 2000 Integrated Water resources Management. [See the summary booklet of this document provided at the Training Workshop]

IWRM is designed to coordinate these management tasks to avoid overlap of effort and ensure that three pillars of sustainable development are addressed (see figure 2.2):

- Ecological sustainability
- Economic efficiency, and
- Social equity

These ideas seem good in practice and have been widely endorsed and supported by practitioners at many levels and in different parts of the water sector. Yet the implementation of IWRM, including at the river basin level and sub-basin level, has not continued satisfactorily. This has resulted despite the idea of IWRM approach existing for many decades, and has been promoted internationally over the last twenty years.

Many basin managers and practitioners in national water resources agencies struggle to know where and how to begin. They struggle with the idea that it can be a stepped process with feedback, especially when they see diagrams like those in this chapter of this manual, which seem to them to oversimplify the complexities they are dealing with. Secondly, they frequently struggle to see the advantages of applying IWRM with respect to their actual situation.

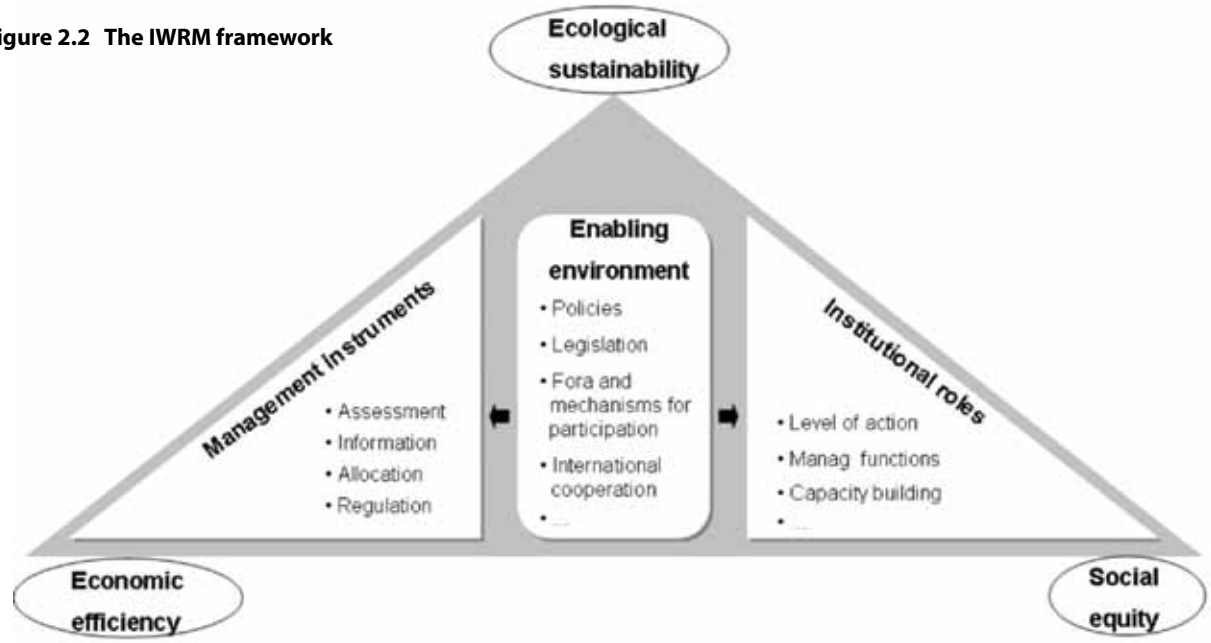
In response, this Training Manual provides information which it is hoped will clarify the basic ideas and provide practical tools to assist practitioners. Training other trainers requires a clear understanding of these tools, but must be grounded in an appreciation of the basic concepts, complex as they are.

IWRM at the national level does not conflict with IWRM at the basin level and, in fact, they are complementary. A comprehensive national framework for IWRM helps both national and transboundary basin management enormously.

Within the limits of a basin, it is not an easy task to integrate land uses and water management. This is because land management, which covers planning, forestry, industry, agriculture and the environment is usually governed by policies not connected to water policy and is managed by many different parts of an administration.

Nevertheless, we can draw practical lessons from the experiences of basin managers around the world who are integrating water management in different contexts. The Volta Basin is an example of where such efforts are underway (Example 2.1). This Training Manual draws together these practical lessons, illustrated where possible with concrete examples, to share what has been learned so far, including from participants of this workshop.

Figure 2.2 The IWRM framework



Case Study

Implementing Priorities in the Mekong River Basin - The Use of IWRM

At the basin scale, IWRM is becoming a reality with the development of the IWRM-based Basin Development Strategy. At the national level, there are still fragmented water related responsibilities between national agencies, and development still tends to be sector driven.

For the Mekong River Commission (MRC). Working with non-government organisations to improve processes for transparent basin wide dialogue, and encouraging the development of national approaches to consultation that relate well to the basin perspective, are key priority for the MRC for the next few years. Its Strategic Plan refers to the success of the MRC as being dependent on its real and perceived transparency, and on its continuous engagement with its many stakeholders. However, all MRC processes must be governed by the views and processes of its "owners" – the four LMB countries – and each country has its own systems, approaches and cultures relating to community or mass participation. It is never straight-forward, nor easy, to blend all of these views into a coherent and well structured stakeholder participation policy and set of processes.

For the countries. The policies, strategy, institutional and regulatory advancements in all countries have provided an excellent platform to maximize cooperation at the basin level through MRC activities. Of major importance will be the continual need to improve agency and staff capacities in IWRM, and to develop a suite of modern management tools, particularly hydrologic and socio-economic modelling packages – at the sub-basin and basin levels - that countries can use to assess new policies and development proposals and ensure sustainable use of the basin's resources. A sound and modern modelling package is the "engine room" of IWRM; without these tools and the skills to use the models and interpret results, it becomes very difficult to assess new developments in a balanced way.

It would be also important to strengthen links of the relatively new national water resource management arrangements, so that issues of common interest can be explored, best practice principles, concepts, guidelines and actions can be discussed and developed, and transboundary issues debated within a framework of a common understanding of the important IWRM issues in the basin. Similarly, a Mekong network of river basin organisations will be an effective form of IWRM capacity building as it will become learning-by-doing and sharing of experiences.

>>> SEE SESSION PLAN 2.1: WHAT IS IWRM?

2.2 The IWRM framework: enabling environment, institutional roles, management instruments

Figure 2.2 above is a way of explaining the interrelationships in IWRM – it is a diagram that shows coordination as a basic tool, and comprises three sections:

(A) ENABLING ENVIRONMENT

This refers to what constitutes the "rules of the game" and makes it easy for stakeholders (people who have a say) to play their respective roles in the development and management of water resources. It also includes the forums and mechanisms, information and capacity-building, created to establish these "rules of the game" and to facilitate and exercise stakeholder participation.

The enabling environment is determined by national, provincial and local policies, legislation and financing and incentives.

Focus Point

Policies – set goals for water use, protection and conservation. Legislative framework – the rules to follow to achieve policies and goals.

Financing and incentive structures – allocate financial resources to meet water needs.

Both a top-down and bottom-up approach for the participation of all stakeholders need to be promoted - from the national-level down to the catchment or watershed level. Decision-making in this context needs to be governed by the principle of subsidiarily, which drives down action to the lowest appropriate level.

>>> **Examine Table 2.1 for a list of tools in this Section**

(B) INSTITUTIONAL ROLES

IWRM is about governance – this is 'the range of political, social, economic and administrative systems that are in place (or need to be in place) to develop and manage water resources and the delivery of water services, at different levels of society' [GWP Toolbox].

While governance may be seen in narrow political and administrative terms as decision making by 'the government', good governance actually requires transparency of the institutions that handle policies, regulations, implementation and oversight, as well as participation by citizen groups in all these functions. Poor governance leads to increased political and social risks, institutional failure and lowered capacities to deliver. Therefore, good water governance requires clear legal frameworks, comprehensive water policies, enforceable regulations, institutions that work, smooth execution and citizen-based mechanisms of accountability, as well as their interconnections.

The bottom line is how the institutions (government departments, laws, administrative systems) which deal with policy, regulations, implementation, execution and oversight understand and deliver as per their roles, and the institutional capacities they need to be effective.

>>> **Examine Table 2.1 for a list of tools in this Section**

(C) MANAGEMENT INSTRUMENTS

Management instruments are the elements and methods that enable and help decision-makers to make rational and informed choices between alternative actions. These include a wide range of methods, both quantitative and qualitative, based on disciplines such as hydrology, hydraulics, environmental sciences, system engineering, legal sciences, sociology and economics.

To make progress in IWRM it is necessary to select the group of instruments that better suit

a specific reality, considering the existing social and political consensus, available resources, and geographical, social and economic contexts; and applying them properly.

As a decision-maker, you need to know which management instruments are in use, and the experiences and lessons that have been acquired after applying these instruments on different realities, so that it is possible to select best options while adapting to local conditions. Look how there are eight classes of management instruments.

>>> **Examine Table 2.1 for a list of tools in this Section**

2.3 Tools for IWRM implementation

As you can see, there are three groups of tools. Let's now review a comprehensive list. Table 2.1 provides a list developed by the Global Water Partnership, grouped into the IWRM framework. These can be found on the GWP Toolbox (for IWRM) website: www.gwptoolbox.org. A, B C etc refer to the category of each tool.

As you can see in Table 2.1, there are over 50 tools, with a strong emphasis on practical management tools (Group C).

Table 2.1 The IWRM framework and IWRM tools

A: THE ENABLING ENVIRONMENT

A1. Policies - Setting goals for water use, protection and conservation
- *A1.1 Preparation of a National Water Resources Policy*
- *A1.2 Policies with relation to water resources.*

A2. Legislative framework - water policy translated into law
- *A2.1 Water rights.*
- *A2.2 Legislation for water quality.*
- *A2.3 Reform of existing legislation.*

A3. Financing and incentive structures - Financial resources to meet water needs
- *A3.1 Investment policies*
- *A3.2 Financing options I: Grants and internal sources*
- *A3.3 Financing options II: Loans and equity*

B: INSTITUTIONAL ROLES

B1. Creating an organisational framework - forms and functions
- *B1.1 Reforming institutions for better governance*
- *B1.2 Transboundary organisations for water resource management*
- *B1.3 National apex bodies*
- *B1.4 River basin organisations*
- *B1.5 Regulatory bodies and enforcement agencies*
- *B1.6 Service providers and IWRM*
- *B1.7 Strengthening public sector water utilities*
- *B1.8 Role of the private sector*
- *B1.9 Civil society institutions and community based organisations*
- *B1.10 Local authorities*
- *B1.11 Building partnerships*

B2. Building institutional capacity - developing human resources
- *B2.1 Participatory capacity and empowerment in civil society*
- *B2.2 Training to build capacity in water professionals*
- *B2.3 Regulatory capacity*

C: MANAGEMENT INSTRUMENTS

C1. Water resources assessment - understanding resources and needs
- *C1.1 Water resources knowledge base*
- *C1.2 Water resources assessment*
- *C1.3 Modelling in IWRM*
- *C1.4 Developing water management indicators*
- *C1.5 Ecosystem assessment*

C2. Plans for IWRM - combining development options, resource use and human interaction
- *C2.1 National integrated water resources plans*
- *C2.2 Basin management plans*
- *C2.3 Groundwater management plans*
- *C2.4 Coastal zone management plans*
- *C2.5 Risk assessment and management*
- *C2.6 Environmental assessment*
- *C2.7 Social assessment*
- *C2.8 Economic assessment*

C3. Efficiency in water use - managing demand and supply
- *C3.1 Improved efficiency of use*
- *C3.2 Recycling and reuse*
- *C3.3 Improved efficiency of water supply*

C4 Social change instruments - encouraging a water-oriented society
- *C4.1 Education curricula on water management*
- *C4.2 Communication with stakeholders*
- *C4.3 Information and transparency for raising awareness*

C5. Conflict resolution - managing disputes and ensuring sharing of water
- *C5.1 Conflict management*
- *C5.2 Shared vision planning*
- *C5.3 Consensus building*

C6. Regulatory instruments - allocation and water use limits
- *C6.1 Regulations for water quality*
- *C6.2 Regulations for water quantity*
- *C6.3 Regulations for water services*
- *C6.4 Land use planning controls and nature protection*

C7. Economic instruments - using value and prices for efficiency and equity
- *C7.1 Pricing of water and water services*
- *C7.2 Pollution and environmental charges*
- *C7.3 Water markets and tradeable permits*
- *C7.4 Subsidies and incentives*

C8. Information exchange - sharing knowledge for better water management
- *C8.1 Information management systems*
- *C8.2 Sharing data for IWRM*

Source: GWP Toolbox www.gwpforum.org

In this Training Manual we are selective from this list of tools and will discuss those thought to be most appropriate to support BDP activities in the Lower Mekong Basin.

Progress in Implementing IWRM in the Mekong River Basin

Water resources management in the LMB is a mix of a "cooperative and coordinating model" at the basin scale (facilitated through the MRC) and four national models where individual sovereignty, customs and administrative systems dominate.

<u>At the basin scale</u>, the four countries in 2005, endorsed an "***IWRM Strategic Directions***" document for the basin. It was a high level "guidance" document and by its adoption, the countries agreed to follow its general IWRM principles and guidelines in future water resources development and protection. However, it was limited in how it linked to the national planning processes. Since 2005, there has been increasing demand from both riparian countries and project developers for the provision of an integrated basin perspective, against which national plans and proposed projects can be assessed to ensure acceptable balance between economic, environmental and social outcomes, and mutual benefits to the countries. This will all be brought together in an ***IWRM-based Basin Development Strategy***, which will be adopted by the LMB countries in 2010.

<u>At the national level</u>, each country is implementing IWRM in a way that suits its particular circumstances. There have been large changes in all countries, particularly relating to developing clear statements of national water related policy and strategy, and developing an institutional and regulatory framework to support these policies, that removes uncertainty as to which agency has the role of the "water resources manager", and gives it strong legal backing through modern water resources legislation. These are foundation issues for "good" national IWRM governance. In Thailand, River Basin Committees are becoming the main bodies for participatory water management at the river basin and local level. Stakeholder information and participation processes are improving at the national and basin levels.

The challenge in most countries is to strengthen agency and staff capacity in IWRM to use the policy, legal and institutional advances to improve water resources assessment, inter-sector coordination and information exchange, planning techniques within hydrological units, water use licensing and compliance assurance, enforcement of regulations, and the financing of

>>> SEE SESSION PLAN 2.2: THE IWRM FRAMEWORK

2.4 Drivers of change in the Mekong River Basin – the need for IWRM

Global developments

Global developments once would have had only a small impact on developing countries. In the last decade this has changed dramatically and now the effect of market changes and global economic downturns and peaks are registered in all countries. Fluctuating oil and natural gas prices can make hydropower development financially more attractive to private investors. Global food shortages and rising prices can make irrigation more profitable in the LMB. Emerging industrial nations such as China and India now seek more diversified food types, and together with potential large investments from Middle Eastern countries in the LMB, this also opens up new market opportunities and new public-private business relationships for irrigation development, all of which can impact on how the basin's resources are used and consumed. In addition, global climate change might change future water availability.

All of these emerging provide additional incentives for the development of significant water infrastructure, including storage projects. The challenge is to develop these projects within an IWRM context, and with an emphasis on developing multi-purpose projects within a basin perspective.

Basin level developments and national level developments

While global developments offer both opportunities and threats, there are many priority issues within the Mekong Basin itself, and within each country, that influence how and when land and water resources could be developed. The cascade of hydropower stations in China on the Upper Mekong Basin will considerably re-regulate flows, to the extent that higher and more reliable flows will occur downstream in the dry season. This makes run-of-the-river hydropower schemes in the LMB financially more attractive and opens up more irrigation potential. But at the same time this brings into question the degree of impacts that could be tolerated from barriers to fish migration and changes in sediment transport.

All governments of the LMB wish to develop water resources for irrigation, hydropower and other uses, and to produce benefits for the many millions of the basin's poor population that live in rural areas. Many are subsistence farmers who supplement what they grow with the fish they catch, and the food and other materials they gather from forests and wetlands. So the need to develop water resources and achieve benefits for rural people must be balanced by proper consideration of the existing needs of these subsistence farmers. Thus, the basin's managers must achieve more sustainable and productive fisheries, more efficient and productive water use in irrigated agriculture, sustainable watershed management, appropriate exploitation of the hydropower potential, free and increased navigation, improved protection against floods, healthy river systems in terms of vital functions and water quality.

The predicted population growth requiring accelerating electricity demand and increasing food requirements, continue to increase pressures on the basin's water resources within the dry season. Also, increasing living standards means changes in attitudes to flooding and food shortages, which require different approaches and policies to both flood protection and irrigation expansion on the delta flood plains in Cambodia and Viet Nam.

All these increasing pressures on the basin's resources call for those aspects of IWRM that aim at increasing synergies, or greater common features, between the policies and practices of the four governments, as well as greater integration/coordination between the national line agency policies and processes. All this places great 'strain' and responsibility of the national resource management agencies to both facilitate these new developments but in a way that is sensitive to the basin's diversified ecological values and attributes.

New investments and development assistance

As the four LMB countries reform and develop government investment policies and clarify the rules for resource utilization, there will be increasing opportunities for the private sector (and foreign "state-owned companies") in the development of water and related resources, such as hydropower, navigation, large-scale irrigation, and industry. In most of these areas, investment from the private sector now outweighs public sector investments. In comparison with conventional public sector driven developments, the emerging private sector developments in the LMB are more opportunity-driven with relatively short planning cycles and assessment processes that meet minimum requirements. As well, private project developers are not obliged to develop projects through processes open to public scrutiny, and are less sensitive to arguments and advocacy promoted by civil society and NGOs.

When private sector projects begin to dominate, the government requires strong government regulatory systems and enforcement capacity. This means greater skills and capacities for the central regulating and resource management agencies and stronger supporting laws and regulations.

Focus Point

The Mekong River Commission – has a well-developed understanding of IWRM, supported by:
- IWRM-based planning capacity
- Knowledge base and assessment tools
- Public participation, and
- Development partners

>>> SEE SESSION PLAN 2.3: DRIVERS FOR CHANGE

Relevant material in other resources

Resource	Section
The Global Water Partnership (GWP) and the International Network of Basin Organizations (INBO) for use of: *A Handbook for Integrated Water Resources Management in Basins.*	1.1-1.3
Global Water Partnership for use of: *Integrated Water Resources Management: IWRM at a Glance*	Whole document
UNESCO IHP/WWAP/NARBO for use of: IWRM Guidelines at River Basin Level.	Presentation Part 1 Principles
Cap-Net, *Integrated Water Resources Management for River Basin Organisations: Training Manual*, June 2008	Module 1

Session Plan

2.5 Session Plan 2.1: what is IWRM?

OBJECTIVES

At the end of this session the participants will be able to:

- Agree on a common definition of Integrated Water Resource Management that will form the basis for discussions throughout the training programme

MATERIALS

- Flip Charts
- Markers Pens

TIME

- 45 minutes

PREPARATION

- Flip chart 1-4: Definitions of Integrated, Water, Resource and Management: On four flip charts write up a definition of Integrated, Water, Resource and Management and place the flip charts around the training room.
- Flip chart 5: Definition of Integrated Water Resource Management (IWRM): Write up a flip chart with the definition of IWRM (see session support material)

STEPS

1. **Introduce the session** by explaining that Integrated Water Resource Management (IWRM) is not a recent term and many of the principles that underpin IWRM have been used in water resource management for 10-20 years. But there still does seem to be some confusion about what IWRM means.

2. **Highlight the four definitions placed on the training room walls,** indicating that these definitions have been taken from a dictionary.

3. **Break the participants into groups of 4 to 6** and ask each group to come up with their own definition of Integrated Water Resource Management. Allow 20 minutes for this group work.

4. Once all groups have finished their exercise, **get each group to stick up their definition on a training room wall** and invited all participants to review the outcomes from the small group work.

5. Once all outcomes have been reviewed, **provide the Global Water Partnership (GWP) definition** (see session support material) and allow participants to compare and contrast their outcomes with how the GWP defines Integrated Water Resource Management and ask for any comments on similarities and differences between the participants' definitions and the GWP definition.

6. **Where there are differences, ask participants to explain these** and ask if the GWP definition needs to be changed to reflect the participants own discussions and experiences. Alter the GWP definition if necessary so that a common definition on Integrated Water Resource Management can be agreed upon by all participants.

7. **Conclude** the session by stating that:
   - IWRM is a systematic process for the sustainable development, allocation and monitoring of water resource use in the context of social, economic and environmental objectives.
   - IWRM contrasts with sector approach where responsibility for drinking water rests with one agency, for irrigation water with another and for the environment with yet another. This lack of cross-sectoral linkages leads has lead to uncoordinated water resource development and management, resulting in conflict, waste and unsustainable systems.

- Different user groups (farmers, communities, environmentalists) need to be involved in decision making over water resource use and the basic IWRM concept has been extended to incorporate participatory decision-making.
- A process of coherent policy making is therefore essential to balance the competing demands for water resource use

Session Support Material

Flip Chart 1 – **Integrated:** To make or be part of a whole.

Flip Chart 2 – **Water:** A clear, colourless, odourless liquid made up of hydrogen and oxygen molecules. It is essential for plant and animal life

Flip Chart 3 – **Resource:** A source of economic wealth for a country or a business. A natural resource is any property of the physical environment (such as minerals or natural vegetation) which humans can use to satisfy their needs.

Flip Chart 4 – **Management:** The skilful or capable use of resources, materials and time. The technique or practice of managing or controlling.

Flip Chart 5 - **What is IWRM:** The Global Water Partnership defines integrated water resources management as a process that "promotes the co-ordinated development and management of water, land and related resources, in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems"[3].

3. GWP TAC 2000 Integrated Water resources Management. [See the summary booklet of this document provided at the Training Workshop]

Session Plan

2.6 Session Plan 2.2: the IWRM framework

OBJECTIVE

At the end of this session the participants will:

- have an introduction to IWRM and how it can be used as a water resources planning, development and management process
- understand the three components of IWRM: enabling environment, institutional roles and management instruments

MATERIALS

- Butchers' paper

TIME

- 60 minutes

PREPARATION

- Ensure there is a stand for attaching butchers' paper responses

STEPS

1. **Create** several groups of 2-4 people
2. In each group, **discuss their perceived needs of the groups** regarding water resources management – this could be done for a specific case study or issue
3. Now **prepare a prioritised list of perceived needs** for your group: be prepared to explain to the whole group why and how you came to the sequence of priorities
4. **Choose a top priority issue** by voting. For the top priority issue, and using Table 2.1, identify
   - One (1) relevant enabling environment tool
   - One (1) relevant institutional role
   - One (1) relevant management instrument to address this issue
5. **Discuss how you should START** to develop an IWRM approach. Bring your answer to group discussion and provide a first step.

Session Plan

2.7 Session Plan 2.3: drivers of change

OBJECTIVES

At the end of the session the participants will be able to:

- List key regional and national drivers (or forces) of change that are either promoting/ contributing to IWRM or constraining or stopping IWRM.

MATERIALS

- Flip charts
- Marker pens

TIME

- 90 minutes (3:20pm to 4:40pm) (45 minutes for Part I and 45 minutes for Part II)

PREPARATION

- Flip Chart 1: An example of a 'Force Field Analysis' (presented to illustrate the use of the tool and expected outcome).

STEPS

1. **Introduce** the session by explaining that IWRM is a dynamic process. There will be negative (constraining/restraining/ inhibiting) actions/forces currently occurring that are or will stopt the implementation of IWRM as well as positive (contributing/driving) actions/forces that can be harnessed or put in place to further promote IWRM.

2. Further explain that the **small group work will be in two parts.**
   - Part I will identify positive and negative drivers for change.

     If time permits, a second part of this session can be conducted.
   - Part II will explore key actions where capacity needs to be built to overcome negative actions and where capacity can be enhanced to further promote positive actions.

Part I: Break participants into small groups of 4 to 6.

3. **Ask participants to write** at the top of the flip chart a brief, but specific and clear description of a future goal for IWRM in the region or their country. It will help if participants are quite specific in writing this goal statement.
   - Make sure only one problem or objective is stated – very broad or multiple problems make this exercise difficult.
   - Coming up with a 'problem' statement and then changing this into a goal statement also helps to focus on analysis.
   - Example: IWRM becomes the basic planning instrument for IWRM in the Lower Mekong Basin Countries

4. **On a flipchart** ask participants to draw up two columns. In the left column driving (positive) forces are to be listed and in the right column, restraining (negative) forces are to be listed. Provide example illustrated in Flip Chart 1.
   - Alternatively, participants can be asked to draw up a fish-bone diagram where the goal statement is the head of the fish, driving forces are the 'bones' on the right side of the fish a negative forces are the 'bones' on the left side of the fish.

5. **List the all driving (positive) forces participants can think.** Again get participants to be very specific i.e. what, who, where, when, how much, how many etc. Indicate how the force will contribute to meeting the written goal.

6. **List the restraining forces** on the right. Again, be specific. Indicate what effect each force is likely to have on stopping the goal from being achieved.

7. **Analyse the forces.** Identify which forces are most important (make sure they are real, not assumed). These are the ones that will have a significant effect on whether or not you can achieve your objective/vision.
   - Circle all the important forces on your list and if necessary rate each force according to a priority, for example on a scale of 1-10, where 1 indicates very weak influence and 10 a very strong influence.
   - Obtain any additional information you may feel is lacking about any important force.

Part II:

8. **Introduce the second part of the exercise** by explaining that each small group is now to examine capacity issues and activities that will help strengthen the key driving forces and weaken the key restraining forces (reducing a restraining force is generally more effective than increasing a driving force).
   - Work on each important force in turn. Identify ways in which enhancing, building or strengthening capacity can increase, strengthen, or maximise each driving force
   - Identify ways in which enhancing, building or strengthening capacity can reduce, minimise or eliminate each of the inhibiting forces working against IWRM.

Plenary discussion:

9. Once small groups have completed their tasks, **get each group to present their findings** but each group should present their driving (positive) forces, then all groups to present their restraining (negative) forces. If part II of the session is completed, all groups should then present their main capacity building activities or challenges.

10. While groups are presenting, the facilitator **needs to identify common issues and challenges** between the groups – these should be clearly written down on a white board.

11. **Begin a discussion** with the following questions:
    - Are there similarities among the groups in how they think strengthening the positive forces will help achieve IWRM in the region/ country?
    - Are there similarities among the groups in ways over come the obstacles identified?
    - What can be learned from the process
    - When should it be done?
    - Who should do it?
    - What are the next steps?

COMMENTS

- The session is based upon exploring the topic by using a Force Field Analysis tool which is a tool used to analyse forces that help or obstruct change or for a specific situation. It can be useful, as part of drawing up a strategic change plan, for examining how feasible a strategic objective is and what areas need to be focused on in any associated action plan.

Flip Chart 1: Example of Positive and Negative Forces Influencing Development of National Forest Policy in Malawi

Positive Forces	Negative Forces
• Inflation down, growth up • Primary school enrolment up • Market liberalisation • Privatisation and deregulation • Land policy reform **Example 1: Developing a National Forestry Policy in Malawi** Driving and restraining forces affecting forestry policy in Malawi, from the wider environment. There are also likely to be driving and restraining forces in the immediate environment, of course.	• Chronic land shortage and food insecurity • Credit use and repayment declining • Roads, law and order, deteriorating • HIV/AIDS spiralling • Chronic shortage of fuel wood • Civil service reform and shrinking budgets • Weakly-planned decentralisation

Chapter 3
The Enabling Environment

Parts of this chapter are drawn from the GWP IWRM Toolbox.

Basically, the enabling environment is determined by national, provincial and local policies and legislation that constitute the "rules of the game" that makes it easy for all stakeholders (people who have a say) to play their respective roles in the development and management of water resources. It also includes the forums and mechanisms, information and capacity-building, created to establish these "rules of the game" and to facilitate and exercise stakeholder participation.

3.1 National policies and strategies

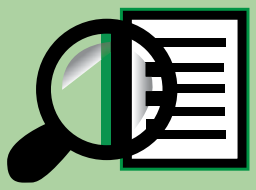
Characteristics

A National Water Resources Policy sets goals and objectives for the management of water resources at the national scale and includes policies for regions, catchments, shared or transboundary water resources, and inter-basin transfers, all within an IWRM framework. It addresses both the quantity and quality aspects of both surface and groundwater resources and also deals with delivery of water services.

A national policy may include matters of jurisdiction and delegation and items like: the extent to which water management is decentralised or consolidated, the use of economic incentives, capacity building to meet institutional challenges, and the monitoring and control to reduce ecosystem degradation. Policies entail measures which require investments and their costs and benefits should be considered before their adoption.

The IWRM approach moves away from single sector water planning to multi-objective planning and integrated planning of land and water resources, recognising the wider social economic and development goals and entailing cross-sectoral coordination. It is a dynamic approach. The IWRM approach is often set within a catchment (watershed) framework. Therefore, the process of policy making for IWRM requires extensive consultation as well as raising the awareness of the importance of integration among policy makers, stakeholders, and the general public. The sustainability of resources and policies should be a central goal.

Policy reform may be incremental in recognition of changing political and resource priorities, or may be able to respond to major shifts in external circumstances, which enable comprehensive redevelopment of water resources policies.



Case Study

National Water Resource Management Organisation (Lao PDR)

Description

Lao PDR has a low population density and low development status. These two facts explain why Lao PDR has as yet not faced significant water resource problems, even though it has only recently started to develop a capacity for integrated water resources management.

The 1996 Water and Water Resources Law is the primary law affecting water resources management. It is a 'framework law' and contains principles and policy-like statements. It may require review and amendment or, at least, the development of many decrees and implementing rules and procedures to make implementation effective. It does not indicate any one ministry or agency that is responsible for the Law, or that a ministry will be nominated by the Prime Minister to be responsible for it, so accountability for IWRM remains confused.

The main institutional problem in the water sector mainly relates to lack of co-ordination between agencies within the sector and with those of other sectors, and loose line of communication and co-ordination between the national agencies and their provincial counterparts. The recent establishment of the Water and Environmental Management Administration (WREA) as a national agency responsible for water resources management is mainly aimed at improving the co-ordination of multi-sectoral activities involving various water uses and also defining and managing water allocations.

In 2007, the Prime Minster issued decree 149/PM establishing the national Water Resources and Environment Administration. The WREA has a mandate to act as advisory body to the government for macro-management on water resources, environment, meteorology and hydrology activities throughout the country. The Lao National Mekong Committee now lays within WREA so both national and international IWRM issues can be better coordinated.

Lao PDR is now in the process of developing a national water resources policy and strategy which will allow, for the first time, a clear perspective to be available for all sector agencies to follow in water resource planning. Its implementation will occur over the next 5 years and will be monitored by the new water management agency within WREA.

The national water resources policy and strategy will amongst other things, more clearly define agency roles and responsibilities and remove the overlap between agency functions that has constrained sound multi-sector development over the last decade. Work is soon to start on modernising the Water Resources Law to provide WREA with clear legal backing and authority to manage national water resources. Provincial agencies are being given greater responsibilities for water resource planning and management, and devolution of management of irrigation schemes has occurred to farmer level. Water planning is now to occur at a river basin level and river basin organisations are now being trialed to assess the appropriateness of this approach for Lao circumstances.

Lessons learned

1. For the first time, Lao PDR now has a policy and institutional framework that encourages good IWRM and provides clear links between national planning processes and the work at the basin scale. The recent establishment of a national water resource management agency with the responsibility for IWRM holds the promise to improve the current low levels of inter-sectoral coordination and data and information exchange.

2. But as with Cambodia, these initiatives are quite new and successful implementation will also depend on a wide ranging capacity building program at all levels and new processes and capabilities in all water resources assessment, modeling, and planning techniques.

Lessons learned

Policies are more useful if they are designed proactively, not just as a short-term response to a crisis (although a crisis may provide an opportunity for policy change). By failing to anticipate change, and taking a narrow sectoral view, water resources policy development has frequently ignored both macroeconomic and development needs.

Some key points for effective integrated policy making are:

- Ensure policies clarify the roles of government and other stakeholders in achieving overall goals and especially define the role of government as regulator, as organiser of the participatory process and as a last resort adjudicator in cases of conflict.
- Identify and set priorities for key water resources issues to ensure a focused policy.
- Recognise that considering water as a social and economic good means designing policies to allocate resources to where they offer the greatest value to society, starting with the fulfilment of basic needs.
- Make explicit in the policy the links between land use and other economic activities.
- Engage stakeholders in policy dialogue, recognising potential conflicts and the need for tools for conflict resolution.
- Recognise the importance of subsidiarily, so that water resource allocation decisions are taken at the lowest appropriate level.
- Take into account trade-offs between short term costs and long term gains.
- Make functional arrangements and cost allocation explicit.

>>> SEE SESSION PLAN 3.1: NATIONAL POLICY AND STRATEGY

3.2 Legislation, regulations and strengthening implementation

This section of the Training Manual is drawn from the GWP IWRM toolbox.

Regulations for water quality

Regulatory instruments for controlling water quality can be aimed at controlling discharges at source, or at managing the receiving environment. They also include regulations for waste minimisation.

Uniform emission or discharge standards apply to all emissions in a specific area (emission approach). Specific emission standards can be set in individual permits. These can be based on the pertinent ambient water quality standards (water quality approach) or on the best available technology (BAT), best practicable technology (BPT) or the best available technology not involving excessive costs (BATNEEC).

A combined approach implies that minimum uniform emission standards are set and that stricter standards are applied if the quality of the receiving water so requires, or if the way the water is used requires higher standards (e.g. for maintaining a delicate ecosystem). Specific regulatory instruments can also be used to protect aquatic ecosystems and riparian habitats, and for the rehabilitation of water resources.

Where discharge standards are difficult to apply, as in the case of non point source pollution, regulations may focus on the techniques or practices; in agriculture for example the best environmental practice approach, which will provide guidelines for application of fertilisers and pesticides for example, is often used. Regulatory instruments can be developed for the protection of groundwater, taking into account the difficulties of monitoring and rehabilitating ground water. Other types of regulatory instruments include:

- Product standards which can be set for some pollutants, such as pesticides, and the widespread banning of DDT.

- Land use controls which may influence the setting of ambient or discharge standards.
- Safety regulations and procedures for accidental pollution may also be useful.

The application of regulatory instruments for water quality control should be based on environmental goals that are set in the policy and planning stage. Furthermore administration and setting of water quality standards must be closely linked with regulations for water quantity, as these are inter-dependent.

Lessons learned

- An ambient water quality approach is usually based on set priorities and is more complex to apply than an emission approach.
- An ambient water quality approach requires the availability of rather detailed water quality data from the recipients.
- For regulations to be effective they need to be implemented by institutions with the capacity for implementation, compliance monitoring and enforcement.
- A water quality approach can lead to different regulatory conditions for similar polluters (and pollutants) in different basins because the condition of the receiving environment, which is used to determine the discharge or abstraction standards, is likely to differ in different locations. This may be politically harder than the application of uniform standards.
- An emission approach or pollution control based on Best Available Technology is essential for pollutants that accumulate in the environment.
- Product standards are appropriate for diffuse pollution because emissions are difficult to monitor.
- Standards should be achievable in the short-term, but they should also stimulate further improvements on the long-term through progressive tightening.
- Tools need to be balanced: e.g. restricting infiltration may increase urban run-off.
- In low income countries, definitions of what is "safe" need to be balanced with what is affordable and appropriate.

Regulations for water quantity

Regulatory instruments for ground and surface water quantity control include permits for ground and surface water abstractions. The quantities permitted may reflect seasonal needs.

Usually, general rules determine when a permit is needed and when not, for example, for which volume of abstractions. General rules may forbid or limit abstractions for specific waters or under such specific conditions as times of drought.

Control of water quantity and quality are closely linked. In surface water systems, abstraction reduces flows and hence the ability of a river or stream to absorb and degrade wastes and thus the ability to maintain desirable ecosystems.

Illegal or uncontrolled abstraction of groundwater for agriculture, industry and household use is widespread in many areas (e.g. peri-urban settlements) and can have serious implications for groundwater quality. Permanent abstractions above the recharge often result in serious saline intrusion in the productive aquifers making the water unsuited for domestic or irrigation purposes.

Effective regulation of water abstractions requires information on the available water resources and the present abstractions. Moreover, sufficient institutional capacity must be available to apply the different tools and for compliance monitoring and enforcement appropriately. The need for institutional capacity should get attention in the water resources assessment and policy and planning stages.

Lessons learned

- Surface water abstractions and groundwater abstractions should be regulated in conjunction to prevent undesired shifts between the two.

- As in the case of regulations for quality, there should be a consistency with institutional capacity for implementation, compliance monitoring and enforcement.
- When regulating water abstractions, non-consumptive uses of water including those of aquatic ecosystems, recreation and navigation need to be taken into account.
- In rivers shared between two or more countries water abstractions need to be agreed between the riparians based on negotiated criteria for sharing of water and benefits.
- Water quantity should be regulated in conjunction with water quality since the two are intimately related. For instance, some domestic or industrial water use can result in polluted return flows that reduce the suitability for downstream uses.

Regulations for water services

Water service providers should be subject to the general quality and quantity regulations. In addition, governments will be concerned to ensure that providers deliver services in an efficient and cost-effective manner and at appropriate service standards. Service providers typically enjoy significant monopoly power; their output levels, service standards and investments all tend to be lower than under competitive conditions, while their prices tend to be higher. Performance regulation has often been seen as only necessary when the private sector is involved but public monopoly providers also need to be put under regulatory pressure to improve their performance. Effectively monitored performance targets, possibly employing benchmarking and the publishing of performance league tables, can play a critical role in public sector institutional reform.

The regulation of private sector providers will depend upon the Private Sector Participation (PSP) option chosen and the amount of competition which is allowed in the sector. Regulation is typically least onerous for service and management contracts, but realistic specification of performance targets, good output delivery data and monitoring capacity are essential. The regulatory burden for concessions and divestiture is considerable. Contracts or operating licences will need to establish mechanisms for tariff adjustments, service standard specification, investment requirements, complaint resolution, dispute arbitration and the imposition of sanctions for delivery failures. Price regulation (and preventing hidden price rises through reduced standards of service) is a critical regulatory task, as is ensuring that companies make efficient investment decisions.

In designing a regulatory system for public and private service providers, governments need to: - clearly specify the regulatory duties, decide how decentralised regulation should be; consider the level of discretion given to and the independence of regulators; ensure regulatory accountability and transparency and ensure that the regulators have the capacity to monitor and obtain unbiased performance data.

Lessons learned

- The monopolistic character of most service providers means that self-regulation is typically inappropriate. Regulation should be separated from provision.
- The regulatory burden can be reduced by allowing comparative (yardstick) competition and benchmarking.
- Regulation of decentralised service providers should normally occur at a higher tier of government to avoid capture and facilitate benchmarking.
- Good independent information on asset conditions, performance standards, operating costs and investment efficiency is an essential prerequisite for effective regulation.
- To be effective regulators must operate independently from both short term political pressures and the regulated companies.

- Regulation is likely to be most effective if it employs incentives as well as sanctions.
- Regulation should be transparent, with maximum use of published performance targets and achievement levels.

Land use planning controls and nature protection

An important topic for IWRM is the interface between water use and land use. Consequently, regulating land use is part of IWRM. The steady growth of urban agglomerations means that the water impacts of land use becomes of paramount importance. Urban growth leads to massively increased local discharges of waste effluent with serious impacts on surface and ground water. In the same way forestry and agricultural activities have significant impacts on both quality and quantity of surface runoff as well as groundwater formation and quality. Land use planning should be a significant component of the implementation of national plans for IWRM.

Land use planning can draw together the various impacts of population pressure or industrial land use on water to ensure sustainable water impacts. Land use planning is vital for safeguarding environmentally vulnerable areas, wetlands and also for riverine ecosystems. But pressure for land development is often intense, and there is frequently conflict between the land requirements for housing, industry, roads etc. and the need for nature protection.

Examples of tools for controlling land use include:

- Zoning identifies areas where specific forms of land use are prohibited or where special rules apply. Examples relevant to IWRM are drinking water protection zones and zones where construction is not allowed because of flooding risks. Protection zones around wells and in recharge areas are useful for protecting ground water and potable water drawn from wells. Protection zones along watercourses gives some protection against direct pollution for instance from nutrients from fertilisers.
- Construction permits are sometimes required before houses or infrastructure can be constructed in protection zones or around urban areas to protect water quantity and quality. Land use planning can be used as an alternative to structural flood protection.
- Building regulations are likewise a means that can be employed to reduce vulnerability to floods.
- Specific soil protection and erosion control measures, such as ploughing parallel to the contour lines and planting trees can be prescribed. Special limitations may apply in designated nature or wildlife areas.
- Waste disposal regulations, e.g. on locations of waste disposal sites, are important for the protection of groundwater.
- Before controlling land use, a wide overview is needed on present land use, along with a vision on future land use. Additionally, adequate institutional capacity must be available for planning and permitting and for compliance monitoring and enforcement. This tool has also links to water resources assessment.

Lessons learned

- Structural flood protection has some serious drawbacks, such as the costs and the increased damage if the structures fail. Consequently, non-structural measures such as zoning, deserve serious consideration.
- Integrating land use controls into IWRM requires effective co-operation and mutual understanding between land use planners and water managers. Co-ordination can be achieved, for example, through an apex body.

>>> SEE SESSION PLAN 3.2: LEGISLATION AND REGULATORY FRAMEWORKS

3.3 Financing and economic tools

Financing Water Resources Management

Characteristics

Perhaps the greatest obstacles for the implementation of IWRM in many countries are institutional deficiencies (fragmentation and insufficient capacity) and the financing of the basic water resources management needs on a sustainable basis: water resources monitoring (quantity and quality), water use permitting and compliance assurance, enforcement of regulations, and the maintenance of a national water information system. These fundamental and basic aspects of water resources management are necessary under any circumstances as they provide the information for water resources planning and management.

There is, therefore, a need for Government to find the right mechanism(s) to fund these fundamental requirements, regardless of any other institutional changes being contemplated, or regardless of Government's perspectives on other priorities. Cost estimated have to be made and options need to be explored for financing these basic functions, independently of considerations of the financing of infrastructure needs in the water sector. Financing options include: the national budget, taxation at the Provincial level, tariffs paid for water use (municipal and irrigation), fees on water withdrawals and wastewater discharges associated with the water use permits (municipal, industrial, irrigation, and hydropower), and combinations of the above options.

Lessons learned

Lack of government expenditure on water resources management is usually the result of the mistaken idea that financing water resources management is a cost to Government. However, it is now well understood in many countries that financing water resources management is not a cost, it is an investment for which there is a return, in cost savings due to correct infrastructure investments, reduced water treatment and a reduced need to respond to crises.

Grants, internal sources, donors and NGO sources

This section of the IWRM Training Manual is drawn largely from the GWP IWRM Toolbox. The on-line examples of each section are useful – they illustrate good practices. If you are online, click here and select from Related Cases.

Allowing for the diversity of the water sector in different countries, and variations in financial sources available, a rational financing strategy is as follows (this tool deals with grants and sources which are "internal" to the water sector):

- Minimise financial costs by the choice of appropriate standards (e.g. deferring the introduction of central sewerage in every case) and technology (avoiding "gold plated" options);
- Encouraging water users to take on some of the costs of local schemes ("sweat equity" in urban upgrading or rural communal schemes) supported by small loan schemes for materials and installations.
- Getting commercial enterprises to undertake their own investment in water conservation and pre-treatment of effluent by a mixture of legal penalties and tariff incentives. In irrigated agriculture there is already a high degree of self-financing, especially on smaller schemes.
- Use revenues from the sale of water and related services to cover recurrent operating and maintenance costs plus a contribution to the cost of investment in expanding and modernising the system. It is important to cover O&M costs from normal revenue, otherwise operations will proceed on a hand to mouth basis and maintenance will be neglected. In the long term, capital investment in water services should also be funded from internal revenues plus borrowing (which is repaid from revenues) but this ideal state may need to be approached gradually, especially in irrigation.
- Tap all potential sources of grants, though taking steps to reduce long term dependence on them (because they are unlikely to be permanent).

- Subsidies from central and local governments, particularly for investment (most governments are reducing recurrent subsidies for water). Funding "public goods" (e.g. watershed conservation, hydrological research) is also an appropriate function of governments.

- Grants from international aid agencies (bilateral donors, UN agencies, EU ISPA, etc). Appropriate for technical assistance, capacity-building, setting up regulatory systems, etc.

- Grants from local and international NGOs raised from voluntary donations, sometimes matched by official aid agencies, which can leverage lending from local banks.

- Grants (including soft loans) from the proceeds of pollution and other environmental taxes, which are recycled within the sector for such purposes as water conservation, pre-treatment of effluent, etc.

Lessons learned

- An active tariff policy, generating an adequate and inflation-proof cash flow, is the best foundation for the sector's long-term financial health, and will be needed as the basis for attracting loans and equity.

- Cost recovery through taxation is difficult in poor countries with weak governments and a parlous fiscal position.

- In recent year's international aid for water has been declining, partly in response to bad experiences, a thin flow of good projects and the poor governance of this sector. In the current climate, with growing international interest and commitments, the prospect for aid is brighter, but much will depend on reforms and capacity building efforts.

Loans and equity

Grants and internal sources (as above) can be supplemented by borrowing and the injection of equity capital. In the long run, both these types of finance have to be repaid or reimbursed from the cash flow from water sales, so they should not be regarded as additional sources.

Some of the larger and middle-income developing countries have large and well-developed local capital markets that can provide the required amounts of loan capital for water. In other cases, foreign borrowing is subject to macroeconomic constraints on the size of public debt, reinforced by IMF pressure, which severely limit the amount of foreign borrowing by poor and highly-indebted countries. The offer of public guarantees, e.g. for foreign exchange risk, represents a contingent liability which effectively raises public debt (though these liabilities are not always reflected in budgets).

Loans should be tailored to the cash flow profile of the investment, and match the offshore/local content of the project. The main sources are:

- Long-term loans from multilateral agencies (World Bank, regional development banks, European Investment Bank, etc).

- Guarantee facilities from the above agencies and governments which improve the terms and conditions on which local loans can be raised.

- Export credit, usually officially guaranteed by the exporting country, subject to the OECD Consensus rules.

- Loans on commercial terms from local (normally no more than five years) and international banks (sometimes longer term if 'enhanced' by guarantees of various kinds.

- Bonds raised locally or overseas, by central and (rarely) municipal, governments, requiring public guarantees.

Equity capital can also be raised by private companies, joint ventures, or utilities with a corporate structure. Equity sources include:

- Private international companies, e.g. in concessions, asset transfers, joint operating ventures, etc.

- Purchase of shares by specialised water and environmental investment funds, usually requiring a rate of return.

- Local institutions, e.g. commercial & development banks, pension funds.

- International and bilateral investment agencies, e.g., IFC, CDC, EBRD.

Lessons learned

- Since water revenues arise in local currencies, it is prudent to raise money locally where possible, to avoid a foreign exchange risk.

- There has been little international commercial bank finance for the water sector; project finance for water has been meagre, partly due to high fixed costs relative to the size of the deal.

- Many of the recent high-profile private international water projects have been problematic, due in particular to foreign exchange risks. These risks are underlined by recent international financial troubles
- Equity investment is a high-cost source of finance. It is flexible in the short term and a buffer for loans, but shareholders demand market rates of return.

- The development of local capital markets is crucial to water finance in the long term.

- Political and regulatory risks are problems in addition to exchange risk. Counter-guarantees between multilateral agencies, central governments and municipalities can help to address this.

Pricing of water and water services

The purpose of water pricing is:

- **Cost reflectivity:** charges signal to users the true scarcity value of water (e.g. through abstraction charges) and the cost of providing the service; they providing incentives for more efficient water use and give investors information on the real demand for any needed service extension. Pricing also helps to identify the most cost effective means of meeting both demands and revenue needs.

- **Environmental protection:** encouraging conservation and efficient use; recognising environmental benefits from leaving water in its natural state.

- **Cost recovery:** generation of revenues for the efficient operation (and debt service) of the present system and its future maintenance, modernisation and expansion, the operation of the sector.

As well as ensuring recovery of costs, an effective tariff should be:

- **Affordable:** recognising the vital role of water, the special needs of socially deserving cases, and the importance of safe water and sanitation for public health. Mechanisms to protect the poorest from high charges while avoiding subsidies to the better off are necessary. The urban poor often pay more (per unit) for water via the informal private sector than the better off pay to the official water utility.
- **Acceptable to the public:** tariffs should be clear, comprehensible and fair.

- **Administratively feasible:** levying and collection of charges should be within the capacity of the water undertaking (links with institutional capacity).

Volumetric tariffs, which charge according to the amount used, are more versatile than fixed charges and can provide incentive for careful use. Tariffs typically combine a fixed and variable element to cover overhead and operating costs respectively. Cost recovery charges for sanitation services are often levied on households and/or industry, typically as a surcharge on the water tariff, but are less easy to set and administer than water consumption charges. Charges are sometimes levied for the cost of connections to public systems, or for the provision of facilities, such as low cost latrines.

Pricing or cost recovery for irrigation systems are beginning to be used, although irrigation water is often heavily subsidised. Volumetric pricing is still the exception, and proxies are used, such as acreage, type of crop, size of harvest; however, with modernisation of irrigation systems, improved charging is feasible.

Direct cost recovery for environmental services or resource management is also rare but has been applied. Charges may be linked to environmental management (e.g. charges for abstraction licenses, or discharge permits).

Lessons learned

- Water pricing is applicable under almost all circumstances, but there are several preconditions for a successful cost recovery policy:
- Public acceptance of the need for cost recovery; people may need a public information campaign to persuade them, if they are used to regarding water as a gift of nature.
- Higher charges are easier to implement when there is an associated service improvement.
- Strong political backing and the avoidance of extravagant and unaffordable promises before elections.
- Thorough demand surveys and consultation with consumers are essential. In poorer communities with underdeveloped services, willingness-to-pay surveys can be a useful pointer to setting appropriate tariffs, provided that the people who actually pay (often women) are actually consulted.
- Careful provision for poor or disadvantaged consumers. Direct support may be more effective, since subsidies often benefit the rich more.
- Financial transparency including independent auditing and regular and automatic price adjustments (based e.g. on inflation).
- Firm and clear public regulation of tariffs set by the private sector see C6.3. [Because of lack of competition and the high social sensitivity of water, governments usually regulate prices whether charged by public utilities, municipalities or private concessionaires].
- Consumers tend to respond to price increases by greater care in water use.
- The structure of tariffs is just as important as the level of charges in achieving equity and cost recovery aims.
- Private companies find it easier to levy and raise charges than their public counterparts.

Pollution and environmental charges

Charges can be levied both to reflect the cost of the use of water as a natural resource (for example through demand management charges such as abstraction levies, or environmental charges) and to cover costs of service provision. This tool focuses on pollution and environmental charges. Environmental charges are designed to reflect cost of damage to the environment resulting from use of resources, whether surface water or groundwater. Pollution charges, a particular type of environmental charge, are designed to reflect the financial and economic costs of discharging wastes into the environment. By levying a charge, polluters are encouraged to reduce their polluting discharges, and in effect are paying for the reduction of the ambient water quality (in the same way as charges are levied for consumption of water by users).
A charging system has the advantage over pure regulation in that it permits some flexibility in the way firms or other polluters respond. A system combining charges and standards may be best of all since standards provide a greater certainty of outcome than prices alone. Other types of environmental charge include levies on abstractions, or charges reflecting the value of the environmental resources used, and provide an incentive for users to change their behaviour, in response to a price change.

Pollution charges can be levied on specified pollutant discharges on the basis of load and/or concentration, and can reflect environmental damage imposed by pollutants. (Note that pollution charges are distinct from sewerage or wastewater treatment charges, which are tariffs or cost recovery charges.

A desirable pollution charge should:

- Reflect the environmental costs of wastewater pollution;
- Bear some relation to marginal abatement costs faced by the polluter (e.g. industrial enterprise or municipality) and be high enough to induce some investment in pollution reduction;

- Generate useful amounts of revenue for clean-up actions;
- Credit polluters for the release of clean effluent for dilution and mixing.

Levying charges on diffuse (non-point) pollution, e.g. from farms, is difficult to carry out directly, and tends to be done by proxy (acreage, number of cattle, etc) or product (e.g. tax on fertiliser).

Although pollution charges offer a useful incentive to polluters to reduce their polluting discharges, most of the established schemes have as their main aim the collection of revenue to finance pollution abatement programmes. This can effectively raise public support for the charges. The charge in itself offers an incentive to reduce discharge. Revenues from environmental charges are sometimes accumulated to special funds earmarked for environment/conservation activities. As with regulations, pollution and environmental charges need effective regulatory and management capacity. It is important to ensure the acceptability of charges if they are to be effective. Pollution charges can be effective where there is transparency and a clear regulatory framework.

Lessons learned

- Few pollution charges are set at levels high enough to encourage to firms to spend sufficient on pollution abatement to meet pollution standards, but the existence of a charge, even at a low level, provides some incentive and may be helpful in raising awareness of the costs of pollution.
- Pollution charges need to be administered as part of an overall system of regulation.
- A precondition for successful pollution charges is the presence of a well-developed monitoring and measuring system.
- Pollution charges have a stronger incentive effect on the polluting party if it has to bear the cost of the charge itself and cannot pass the costs on to consumers.
- Planned progressive increases in charges are useful in allowing dischargers to adjust their processes over a given time period.

Water markets and tradeable permits

Water markets & transferable water rights: these tools allow sales of water allocations from one group to another. The markets can apply to either surface - or groundwater, and the transfer of rights may be seasonal or permanent. Such markets can:

- Enable water to be transferred from lower- to higher-value uses.
- Overcome the resistance of the entrenched property rights of existing holders.
- Be a cheaper way for communities or farmers to obtain their water than the alternatives, which may include creating a new source of supply.
- Be used by environmental champions, to buy out existing users and preserve the water for habitat or natural amenity.

Water auctions: Public authorities make water available to the highest bidders at public auctions. The water lots could be on a daily, weekly, seasonal or even annual basis. Auctions are a useful source of revenue to public authorities, but they can create conflicts of interest if the revenue raising function becomes more important than the issue of efficient water allocation.

Tradable Pollution Permits: Individual polluters can be allowed the right to buy and sell quotas of emissions subject to an overall upper quota on total emissions. Nutrient trading is a potentially useful instrument to improve water quality.

Certain preconditions are necessary for water markets and auctions to be successful:

- A clear and permissive legal framework, within which individual holders of water rights can transfer their rights, either temporarily or permanently, to other parties.
- A procedure for considering the impact of these trades on third parties (e.g. downstream users) and, where appropriate, arranging compensation.

- Recognition of the potential environmental impact of trades, and the need to invoke relevant safeguards.
- The physical means of transferring water between potential users.
- Strong provision by Government of the legal, social and economic environment for effective market operation.
- Regulation to avoid monopoly build up is essential.

Lessons learned

- As with charging systems, it is important to ensure that vulnerable groups are protected.
- There is a need for a mechanism for initial allocation of rights (whether for water or pollution discharges) which should be seen to be fair, and be equitable and effective.
- Experience suggests that water auctions can be efficient and effective in some situations.
- Trading schemes can be intensive in terms of information and enforcement, hence costly to administer; the high transaction costs of certain markets may outweigh their benefits.
- Markets can help identify the highest value use and assist in conflict resolution.
- Water auctions may be useful to adjudicate water allocation under competitive conditions, but must be regulated to prevent monopoly build up.
- Markets work best where there are a large number of traders and transactions, so that the risk of build up of monopolistic "market power" is minimised.

>>> SEE SESSION PLAN 3.3: ECONOMIC TOOLS

3.4 Subsidies and incentives

Characteristics

Subsidies can be used to protect vulnerable and poor groups in society but great care is necessary to ensure that they do not simply benefit the better off.

However, subsidies often encourage excessive consumption of water, either when its use is directly subsidised or where the prices of goods and services that consume water are subsidised, or affect its use. Examples include:

- Industrial plants that are heavy water users, operating in a protected, subsidised regime, lack any incentive to conserve water or use it efficiently;
- Low prices in the power/energy sector encourage excessive use of water;
- Subsidised prices for "thirsty" farm crops, causing heavy use of irrigation water.

Setting the right price signals ('getting prices to tell the truth') means that existing distortions in the workings of the market should be removed. For instance, farm prices should become more market-based or industrial firms should operate in a less protected environment or the prices of energy should be liberalised.

Taxes and/or subsidies need to be applied in a selective way to reflect environmental considerations ("green" taxes and subsidies) or other specific policy aims. For example, polluting farm chemicals should be taxed while water-efficient appliances could be subsidised. Subsidies can be used to encourage changes in behaviour (as for instance, to encourage the introduction of drip irrigation.

Pricing of water alone will not have its desired effect if it is frustrated by policies elsewhere that pull in the opposite direction. This lesson has been clearly learned from attempts to reduce water use in agriculture and reduce the waste of water and pollution in highly protected industries.

All major policy areas affecting water use should be "joined-up" (with financing structures and water policies). The market signals faced by

water users (whether individual households, institutions, firms or farmers) should be consistent and persuasive.

Lessons learned

- The introduction of new subsidies should be very carefully considered, since they tend to be difficult to remove and can become a fiscal burden. However, they can be useful to encourage the uptake of unfamiliar technology (e.g. recycling and water-efficient irrigation methods) or stimulate pilot schemes that might lead to wider acceptance of desirable practices.

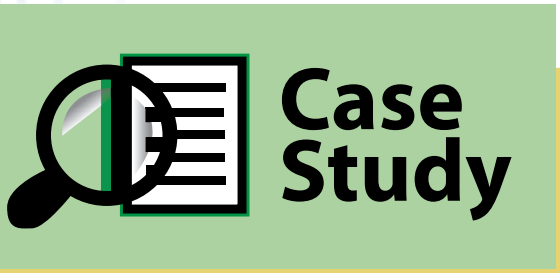
- Subsidies (such as low-interest loans) might also be a way of tackling stubborn market failures (e.g. the habit of needing excessively short pay-back periods for recycling or water-efficient appliances).

- Subsidies can also be used in combination with a tax/charge regime to make the regime more acceptable, since people and firms paying the tax can see that the revenues are being applied for the same purpose, and can even benefit from them.

- Policy reforms aiming at the removal of economic distortions can have the double benefit ("win-win" policies) of economic and environmental gains.

- But there is also a risk that general economic reforms that do not address distortions specific to the water sector may aggravate the latter's problems. For instance, trade liberalisation may increase pressure on a natural resource like water, unless accompanied by a concurrent water reform programme.

- Subsidies may help those who already water services, but not benefit those without access to water.



Tunisia - Reform of Irrigation Policy and Water Conservation

Source: GWP's IWRM Toolbox (Case Study (#19)

Description

An arid country with limited water resources, Tunisia depends heavily on irrigated agriculture. The sector contributes 30-40% of the value of agricultural production, and is highly important in some regions. However, abstraction for irrigation accounts for 83% of the available water resources, competing with other uses. To conserve water resources and encourage demand management in the irrigation sector, a national water saving strategy was implemented. As part of the strategy, a number of reforms were introduced in the past few years, including the promotion of water users' associations, an increase in the price of irrigation water, and the use of incentives to adopt technologies that water at field level. The strategy also introduced a number of supporting actions such as strengthening of applied research, improved agricultural marketing and capacity building in the irrigation sector. The integrated strategy has resulted in a marked and sudden increase in national awareness of water scarcity, and the value of water in the country's economic development.

Specific measures introduced by the new strategy included:

- Creation of a legislative framework to promote water users' associations and financial incentives for water saving
- Strengthening capacity in all water management sectors, including the management water users' association supervision, training of trainers, and improving farmers' awareness of the need to improve the irrigation practice
- An increase in water tariffs to reinforce users' participation in cost management and to provide incentives for the adoption of water saving techniques.

Lessons learned

1. Integrated reforms that take into account the technical, economical and institutional aspects of water demand can make a significant impact on water management and conservation
2. To gain the support of farmers, reforms must seek to improve farmer's incomes
3. Financial incentives accelerate the adoption and use of efficient irrigation techniques.

Importance of case for IWRM

The irrigated sector in Tunisia is similar to that of other countries of North Africa and the Middle East. In all, the sector is characterized by high consumption and production of waste water, socio-economical constraints, and competition between users. In addition, the importance of agriculture to the social and economic life of the country makes the introduction of any irrigation management reform risky. The Tunisian experience can enrich the debate on the costs and benefits of establishing water demand management in agriculture.

>>> SEE SESSION PLAN 3.4: INCENTIVES

Relevant material in other resources

Resource	Section
The Global Water Partnership (GWP) and the International Network of Basin Organizations (INBO) for use of: *A Handbook for Integrated Water Resources Management in Basins.*	Chapter 5
UNESCO IHP/WWAP/NARBO for use of: IWRM Guidelines at River Basin Level.	Part 2-1, Section 3.5 Part 2-2, Section 3.5
Cap-Net, *Integrated Water Resources Management for River Basin Organisations: Training Manual*, June 2008	Module 2, Section 4

Session Plan

3.5 Session Plan 3.1: national policy and strategy

OBJECTIVES

At the end of this session the participants will be able to:

- Identify and examine the role and impacts of national policy and strategies on IWRM.
- Understand the relevance of analysing sectoral policies for effective planning and implementation of IWRM.

MATERIALS

- Flip charts
- Marker pens

TIME

- 45 minutes

PREPARATION

- Write on a flip chart a definition of Policy (Session Support Material)

STEPS

1. **Introduce** the purpose of the session and explain the importance of national IWRM related policies and legislation in helping or hindering IWRM reform in a country.
2. **Explain** that during the session participants will examine and discuss IWRM policies from their own country (or their own Province if policy exists at this level) and the impacts of these policies on IWRM.
3. **Divide the participants into small groups of 4 to 6** and get each group to discuss key pieces of existing (or proposed) water management legislation or policy from their country or region. Encourage participants to start with the most recent legislation or policy and get each group to clearly write these important pieces of legislation or policy on a flip chart.
4. Each group should then **examine the specific aspects of the listed policy/ legislation** that supports IWRM and those that do not. Get each group to clearly identify and write down how these aspects of identified policy/legislation impact on IWRM.
5. At the end of 40 minutes, **ask each of the groups to present its results** briefly and initiate a plenary discussion around the following:
   - What are the similarities and differences among the different country or local policies on a broad level, and on a specific level? Why might these similarities or differences have developed? (This may be related to a number of historical, social or political factors.)
   - In general, are most water policies supportive or unsupportive of IWRM approaches (Point out that, while overall policies may appear unsupportive, there can be specific aspects within the broader framework that might be more supportive.)
   - What are the general trends in the evolution of IWRM policy in the different countries, and why? (It is important here to try and examine links between changes in policy and the reasons for those changes.)
   - How might unsupportive policies be changed to become more supportive?
   - How do supportive or unsupportive forest resource policies affect the occurrence of conflict?

COMMENTS

- If the participants are all from the same country, the groups can be divided on the basis of state or regional differences in policy within the country in order to look at local level policies.

Session Support Material

Flip Chart 1: what is policy?

- A preset framework based on guiding principles within which an individual, government or
- Organisation operates in order to realise specified goals/objectives
- Guidelines for governance of the state and allocation of resources
- Framework for pursuing national or state aspirations and sometimes solving citizens' problems

Session Plan

3.6 Session Plan 3.2: legislation and regulatory frameworks

OBJECTIVES

At the end of this session the participants will be able to:

- Map their own 'formal' legislative and regulatory planning and management hierarchy for IWRM.
- List some of the difficulties of linking local government management responsibilities and accountabilities to higher and lower planning and management levels.
- Assess the relevance of appropriate, context-specific IWRM systems for the success and positive impact of IWRM policies

MATERIALS

- Flip charts
- Marker pens
- Handout: The IWRM Planning Hierarchy

TIME

- 90 minutes

PREPARATION

- Draw on a flip chart the IWRM Planning Hierarchy
- Cleary write down the tasks involved for the group work.

STEPS

1. **Explain** that during this session we will be looking at examples of the 'formal' planning and regulatory reality for IWRM. Indicate that the 'informal' is probably just as important as well, but lot more difficult to assess.
2. **Explain** that we are now going to be divided into small groups based on either local government or country groups depending on where participants are from.
3. **Outline the IWRM Planning and Regulatory Hierarchy** (using a flip chart) and provide all participants with the handout of the Hierarchy. Explain that the diagram illustrates the different levels of management in the water sectors. Ensure that hierarchical terms (e.g. for province, district etc.) are adapted for each country by inviting participants' contributions.
   - Break participants in geographical (sub-national or national) groups and ask each group to MAP the planning and regulatory hierarchy in their country or geographical region for each of these regulatory instruments: *water quality, water quantity, water services, land use planning controls*
   - At each level and for one of each regulatory instruments (i.e. ONE of *water quality, water quantity, water services, land use planning controls*) describe:
     - o Which institutions are involved in water management and regulation at each level –
     - o What is the process of management and regulation at each level?
     - o What are the outcomes/outputs at each level?
     - o How do national (strategic) legislative processes link with other levels of management and regulation (provincial, district, and community)?
     - o What are the problems of linking district management and regulation to other levels?
     - o What would your group do to improve these links by considering what kind of decision and tasks can be taken best at which level?
4. **Ask participants to present and explain** their hierarchies and seek any clarifying questions from participants.
5. **Initiate a discussion** around the following questions:
   - What institutions are involved in water regulation and how are these institutions linked from the local level to the national level (such as financial

This session plan continues on the next page.

linkages, information linkages, resource linkages, biophysical linkages)? As there linkages effective and leading to an integrated approach to water management?

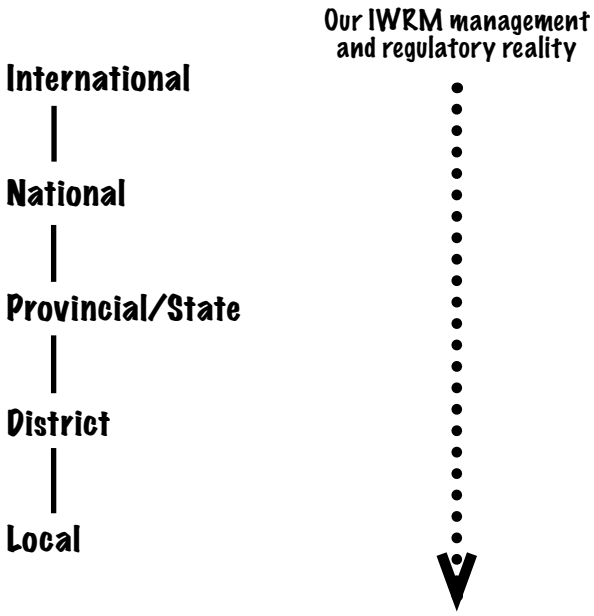
- Is national and provincial level policy important for the management and regulation of water resources?
- What areas do you think need to be improved?

COMMENTS

- Adapt the 'Hierarchy' and the terms used, to the specific national and/or sub-national context.
- Take time to explain terms such as 'institutions', 'organisations' and 'regulation' that might not be known to participants.
  - **Institutions:** Institutions are sets of rules governing the actions of individuals and organisations - and the negotiation of differences between them.
  - **Organisations:** A social group with a structure designed to achieve common goals. Organisations are how we structure ourselves to play, according to the 'rules of the game'. Organisations are thus groups of actors who come together for a common purpose. They adapt their tactics and organisational behaviour and culture according to the rules of the game. Organisations encompass political parties, parliaments, firms and businesses, churches and schools.
  - **Regulation:** A principle, rule, or law designed to control or govern water use.

HANDOUT

Draw the IWRM management and regulatory hierarchy diagram for your country or geographical region (using local names).



In your group answer the following questions. Illustrate the answers on your planning hierarchy diagram:

- Which institutions are involved in management and regulation of water **at each level**?
- What is the process of management and regulation **at each level**?
- What are the outcomes/outputs **at each level**?
- How do national (strategic) legislative processes link with other levels of management and regulation (provincial, district, and community)?
- What are the problems of **linking district management and regulation** to other levels?
- What would your group do to improve these links by considering what kind of decision and tasks can be taken best at which level?

Session Plan

3.7 Session Plan 3.3: economic tools

OBJECTIVES

- The purpose of this session is to ensure participants understand different types of economic and financing tools and the effectiveness for water resources management.

MATERIALS

- This chapter of the Manual
- Pens, paper

TIME

- 50 minutes

PREPARATION

- Request all workshop participants read this chapter before the session

STEPS

1. **Distribute** the following list of lessons learned as a handout (this comes from the above section 'Financing and economic tools' of this chapter of the Manual):
   - An active **tariff policy (1)**, generating an adequate and inflation-proof **cash flow (2)**, is the best **foundation (3)** for the sector's l**ong-term financial health (4)**, and will be needed as the basis for attracting **loans (5)** and **equity (6)**.
   - **Cost recovery (7)** through taxation is difficult in poor countries with weak governments and a **parlous fiscal position (8)**.
   - In recent year's international aid for water has been declining, partly in response to bad experiences, a thin flow of good projects and the poor **governance (9)** of this sector. In the current climate, with growing international interest and commitments, the prospect for aid is brighter, but much will depend on **reforms and capacity building efforts (10)**.
2. Working in pairs, **define each of the 10 items** highlighted in **bold**.
3. **Explain the importance of the 10 items** highlighted in **bold** as an economic and financing tool.
4. **Get the group to choose a session leader** by voting, and ask him/her to advise on what a/he thinks is the top most effective economic/financing tools in the Lower Mekong Basin.
5. **Allow the group to debate** the effectiveness of his/her suggestions.

Session Plan

3.8 Session Plan 3.4: incentives

OBJECTIVES

- The purpose of this session is to understand the use of incentives on water resources management and their role within an integrated process of water reform.

MATERIALS

- This chapter of the Manual, especially the case study: Tunisia ~ Reform of irrigation policy and water conservation, which is included above. NB: it is recommended the whole case be downloaded and pre-read prior to the session. Use the GWP website reference (case #19, at www.gwptoolbox.org)
- Pens, paper

TIME

- 50 minutes

PREPARATION

- Request all workshop participants read the following case study before the session.

STEPS

1. **Working in country groups of 2-3 people**, list the main economic reforms of the Tunisian case
2. **Using the approach from the Tunisian case study**, prepare an application of the case to the country where the participants come from, using the matrix below.

COMMENTS

- Allow time for the group to debate the effectiveness of this approach.

	Incentive	Possible positive impacts	Possible negative impacts
Item:			
- irrigation water pricing			
- urban water pricing			
- value of water pollution fines relative to other water prices			

Chapter 4
Institutional Roles

Parts of this chapter are drawn from the GWP IWRM Toolbox.

IWRM governance is defined as the range of political, social, economic and administrative systems that are in place (or need to be in place) to develop and manage water resources and the delivery of water services, at different levels of society.

While governance may be seen in narrow political and administrative terms as decision making by 'the government', good governance actually requires transparency of the institutions that handle policies, regulations, implementation and oversight, as well as participation by citizen groups in all these functions. Poor governance leads to increased political and social risks, institutional failure and lowered capacities to deliver. Therefore, good water governance requires clear legal frameworks, comprehensive water policies, enforceable regulations, institutions that work, smooth execution and citizen-based mechanisms of accountability, as well as their interconnections.

The bottom line is how the institutions (government departments, laws, administrative systems) which deal with policy, regulations, implementation, execution and oversight, understand and deliver their roles, as well as the institutional capacities they need to be effective.

These institutions need administrative, legal and organizational tools such as governance reforms, legislation, apex bodies, local authorities, river basin organizations, water utilities, and a range of other institutional arrangements down to communities that can deliver sustainable water management.

4.1 Transboundary organisations

IWRM at the basin level requires a transboundary organisation to act as the advocate for the basin and provide direction and leadership. These bodies vary depending on their reason for formation.

Transboundary organisations provide a framework for managing water resources across international boundaries, where there are issues about the management of common (cross-jurisdiction) property resources. Such organisations vary in type and function according to the political context, the water resources challenges and the cultural features of the area. They are often based on voluntary agreements between sovereign states, but may include international and intra-national water authorities and commissions. Traditionally, international organisations have been set up to address a given problem – navigation, flooding; but their remit can be and often has been expanded to tackle wider water problems in the basin. While ministers in each country often wish to retain ultimate responsibility for decisions, it can be helpful to establish some kind of consultative body to broaden the range of stakeholder involvement.

The type of agreement underlying these organisations varies greatly around the world, from ad hoc arrangements, memoranda of understanding, to formal international treaties and agreements. It is clear that the effective functioning of transboundary organisations requires a secure funding base, the political will of governments, and the commitment of the partners who create them. An IWRM approach requires that human resources and institutional capacity in transboundary structures are able to address social issues, as well as environmental and economic development imperatives.

To develop the essential confidence to enable transboundary water resource management and collaboration, parties need to build and accept common data sets and knowledge about the water resource issues, and share visions about the future of the resource.

Although basin organisations carry out many

tasks, they tend to focus on three main areas:

- Monitoring, investigating and co-ordinating and regulating,
- Planning and management, and
- Developing and regulating.

The Comprehensive Assessment of Water Management in Agriculture (CA), together with the Global Water Partnership and the International Network of Basin Organisations has drawn up a list of the main tasks in integrated water resources management in basins in these three areas. Depending on the purpose for which the basin organisation has been created, and the arrangements for management, it may cover some or all of these functions. The critical issues from the integrated water resources management perspective are that, in carrying out these tasks, the basin organisation

A Main functions of basin organisations

Monitoring, investigating, co-ordinating and regulating

- Collecting data Collecting, managing and communicating data regarding water availability, water demand (including environmental requirements), and water quality to support different basin functions.
- Prevention, monitoring and enforcing Monitoring and control of water pollution, salinity levels and ground water extraction – ensuring that they remain within accepted limits; and enforcing relevant laws and regulations to prevent degradation/ overexploitation and to restore ecosystems.
- Co-ordinating Harmonising policies and actions undertaken in the basin by state and non-state actors relevant to land and water management.
- Resolving conflicts Providing mechanisms for negotiation and litigation.

Planning and financing

- Allocating water Defining mechanisms and criteria by which water is apportioned among user sectors, including the environment.
- Planning Formulating medium- to long-term plans for developing and managing water resources in the basin.
- Mobilising resources Ensuring financing, for example, by collecting water user fees or water taxes.

Developing and managing

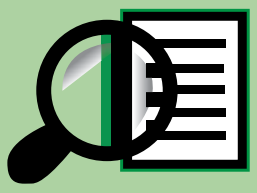
- Constructing facilities Designing and constructing water infrastructure.
- Maintaining facilities Maintaining water infrastructure.
- Operation and management Ensuring that dams, navigation and water distribution infrastructure, and wastewater treatment plants are properly operated; that allocated water reaches its point of use; and that surface and ground water are conjunctively managed.
- Preparing against water disasters Protecting from floods and developing emergency works, flood/drought preparedness plans, and coping mechanisms.
- Protecting and conserving ecosystems Defining priorities and implementing actions to protect ecosystems, including awareness campaigns.

Source: Comprehensive Assessment of Water Management in Agriculture 2008

should be flexible; work at all levels and works collaboratively.

Lessons learned

- Once established, transboundary organisations and water agreements are remarkably robust – contrary to popular belief, they often act as a moderating factor within a conflict situation.
- Establishing the conditions for agreement can be time consuming and costly in terms of money and resources (e.g. brokers and negotiators to build confidence). Donor support can be helpful here.
- The use of a respected external party or organisation to act as honest broker is useful (multilateral agencies such as the UNDP and World Bank have both fulfilled these roles).
- National water policy needs to support inter-agency co-ordination for the transboundary organisation and may need to be modified to align with the other parties to the agreement.
- Citizen, media and NGO pressure frequently galvanises action: e.g. To reduce environmental problems from water overuse.
- Once established, transboundary water management needs to move beyond visions, and develop specific regulatory mechanisms, data and information sharing protocols and financing mechanisms to put transboundary water management firmly on the ground. Experience shows that technical secretariats are essential in this respect.



Case Study

The Mekong River Commission

The Mekong River Commission is an example of a transboundary organisation. It has had mixed – but constantly evolving – results. During the past 10 years, the parties to the 1995 Mekong Agreement have entered into several sub-agreements, procedures and other technical guidelines as implementation has progressed:

- Procedures for Data and Information Exchange and Sharing (2001);
- Technical Guidelines on Custodianship and Management of the Mekong River Commission Information System (2002);
- Procedures for Water Use Monitoring (intra-basin water use and inter-basin diversions) (2003);
- Procedures for Notification, Prior Consultation and Agreement (2003);
- Procedures on the Maintenance of Flows on the Mekong Mainstream (2006);
- Procedures on the Maintenance of Water Quality (endorsed by the JC in 2006).

Many of these agreements, however, are ambiguous, difficult to implement and lack clear enforcement mechanisms. For instance, in June 2006, the Mekong River Commission (MRC) ministerial council could only agree to agree on procedures to maintain flows on the Mekong. Clear and enforceable implementation procedures are still needed to maintain environmental flows.

Extracted from: Sadoff, C., Greiber, T., Smith, M. and Bergkamp, G. (2008). Share – Managing water across boundaries. Gland, Switzerland

4.2 National organisations (sector agencies)

At the national level in riparian states, an apex body in the water sector can drive integrated river basin planning.

Apex bodies consist of a range of entities such as high level steering groups within national governments, inter-agency task forces (for specific purposes e.g. water pollution control), as well as international consortia for the management of water resources. The aim of such bodies is to provide structures for co-ordination between different organisations involved in water resource management. In some cases water policy and management is centred in a specific body of government but in many situations responsibility for water is shared between a number of bodies (e.g. ministries for irrigation, environment and public works) that may not be able to operate easily together. Here an apex body may provide a useful co-ordinating function.

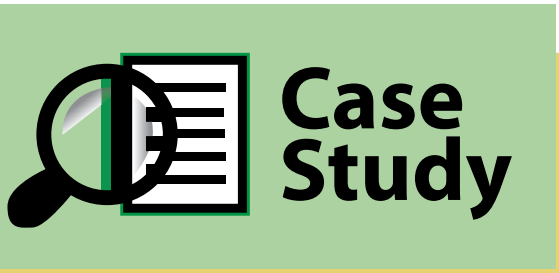
The functions of these bodies vary considerably. As many governments endorse and seek to use IWRM, the intended outcomes include:

- Improved co-ordination of government functions through integrated plans of action
- Structural change within government agencies to facilitate better co-ordination
- Creation of new departments or commissions and authorities for natural resources management, aligned to river basins and/or ecological zones

The role of an apex body depends on the economic, social and encompassing political issues, even more than on the technical IWRM issues.

Lessons learned

- Successful experience to date in establishing robust and respected apex bodies is limited.
- Establishment of a successful apex or coordinating body can be a slow process, since it takes time for a new body to achieve legitimacy.
- The effectiveness of an apex body is linked to the specific political and historical context
- For an apex body to function effectively, all the stakeholders who are involved in the functions under its jurisdiction need to develop commitment to it and ensure it has appropriate powers. Conflict management and awareness raising techniques are important here.



National Organisations in Viet Nam

The Ministry of Natural Resources and Environment (MONRE) of Viet Nam has been established since 2002 as an integration of the Land Administration, Hydrological – Meteorological Services, National Environmental Protection Agency (of Ministry of Science, Technology, and Environment), General Department of Geology and Minerals and Institute of Geology and Minerals (of Ministry of Industry), and Division of Water Resources Management of Department of Water Management and Hydraulic Works (Ministry of Agriculture and Rural Development - MARD), and its functions, responsibilities, obligations and organisational structure stipulated by the Decree No. 91/2002/ND – CP dated 11 November 2002, then strengthened by the Decree No. 25/2008/ND – CP dated 4 March 2008 of the Government of Viet Nam.

After the evolving institutional changes since early 2000, and many debates on sharing functions and responsibilities in water resources management between MONRE and MARD, which attracted a lot of interests and concerns, currently, Ministry of Natural Resources and Environment has overall responsibility for water resources management including water resources planning in river basins, water allocation for each economic sector, and water resource protection and natural hazards preventions. The Ministry also is responsible to assist the Government to implement international treaties, agreements that Viet Nam is signatory regarding the water resources development and management in trans-boundary river basins.

In the division of responsibilities between MONRE and MARD, MONRE oversees MARD to set up river basin planning. MONRE is a licensing authority for water use – but water supply and irrigation are under MARD. Additionally hydropower development is under the jurisdiction of Ministry of Industry and Commerce – but MONRE controls authorization through appraisal of EIA/SEA reports.

Establishment of an unique national apex body for water resources management – the Ministry of Natural Resources and Environment, and provision of clearer functions and responsibilities of relevant ministries relating to water and related natural resources management, and importantly, the reality of implementation of coordinated water resources management, which have been taking place, will improve the water resources management in Viet Nam.

4.3 Division of responsibility and accountability between levels and sectors of Government

This is one of the critical tasks to implement a co-ordinated approach. International (transboundary) river basin organisations can advise national governments but rarely, if at all, have any international legal jurisdiction, as this is a matter of internal administration of riparian countries. Protocols and international agreement encourage this type of co-ordination.

The co-ordination of the ongoing divisions and the accountability of water and other agencies in a national government are often undertaken by a peak (apex) body as described above. One example is the national coordinating council at the cabinet level of government which can oversee these activities (who is responsible for what, have they achieved their objectives with respect to national water planning and management within a whole of basin context.

IWRM Governance in Cambodia

Description

Each country in the Lower Mekong Basin is progressing the "modernisation" of IWRM at the national level in a way that suits its particular circumstances. There have been large changes in all countries, particularly relating to developing clear statements of national water related policy and strategy, and developing an institutional and regulatory framework to support these policies, that removes uncertainty as to which agency has the role of the "water resources manager" and gives it strong legal backing through modern water resources legislation. These are foundation issues for "good" national IWRM governance.

Cambodia has developed a number of statements of water policy and strategy over recent years with varying degrees and levels of government endorsement. Work is now proceeding to develop a clear implementation plan, or roadmap, that will more clearly guide the various sector agencies in water planning activities and allow the "water resources manager" – the Ministry of Water Resources and Meteorology (MOWRAM) – to monitor progress and compliance, and foster the links to the basin scale activities, through the close cooperation of the Cambodian National Mekong Committee.

A modern Law on Water Resources has recently been approved which establishes IWRM as a fundamental principle water planning and management. It stipulates MOWRAM as the water resources manager and clearly specifies the processes for national and basin level water planning. It is now being made operational through a number of implementing sub-decrees. Implementation is being decentralized to province and district levels, and provisions exist for the creation of river basin committees in sub-basins that are under stress from development, or are likely to be in the near future. For example, a Tonle Sap Authority has been established to coordinate major water development and planning in that sub-basin. Basin forums can be established in less threatened sub-basins and watersheds to advise on water planning and management issues. Irrigation scheme management is being transferred to the farmer level with legal backing from the new Law, which separates the water regulatory role of MOWRAM from the water distribution and use role – an essential step if proper accountabilities are to be created.

Lessons learned

1. These initiatives are quite new and successful implementation will depend to a large degree

on building human resource capacities, improving the range and extent of data and information that is collected and processed, and developing new water resource technological and analytical systems and tools, such as hydrologic and socio-economic modelling capabilities. This needs to occur at all levels of government to ensure effective implementation of IWRM at national and basin scales, and proper compliance by all water sector agencies.

2. A national water resources policy and complementary strategies for implementation are the guideposts for the planning and management activities for all sectors related to water resources management. Without a clear national water policy statement, agencies cannot properly relate sector plans and development to national goals and objectives, nor can they clearly link to basin wide perspectives.

4.4 Data and information exchange between levels and sectors of Government

Development and coordination of information resources is critical to achieve high levels of river basin planning, as it informs decision-making at different levels. This activity is discussed further in Chapter 7.

4.5 River basin organisations at the sub-basin level

These exist in many countries where intra-national (within a nation) river basins occur and there has been an effort to establish basin management planning and development. The following material is drawn largely from the GWP IWRM Toolbox.

Characteristics

National river basin organisations (RBOs) are specialised organisations set up by political authorities, or in response to stakeholder demands. RBOs deal with the water resource management issues in a river basin, a lake basin, or across an important aquifer. The focus here is the basin organisations that are domestic, not transcending state boundaries. River basin organisations provide a mechanism for ensuring that land use and needs are reflected in water management - and vice versa. Experience has varied dramatically in the ability of these organisations to achieve IWRM. Their functions vary from water allocation, resource management and planning, to education of basin communities, to developing natural resources management strategies and programmes of remediation of degraded lands and waterways. They may also play a role in consensus building, facilitation and conflict management.

Recent innovation has focused on an integrated river basin management approach (IRBM), a subset of IWRM, and catchment management rather than single sector approaches. (See also basin management plans in this Manual)

The form and role of a river basin organisation is closely linked to its historical and social context. Key characteristics of sustainable river basin management are:

- Basin-wide planning to balance all user needs for water resources and to provide protection from water related hazards;
- Wide public and stakeholder participation in decision-making, local empowerment;
- Effective demand management;
- Agreement on commitments within the basin, and mechanisms for monitoring those agreements;
- Adequate human and financial resources.
- Varying opinions exist about the most effective scale of application: the success of a river basin organisation may depend on such things as, the level of human and institutional capacity of the civil society, the degree to which water resources are developed, and climatic variability (arid

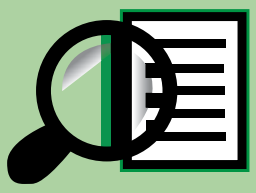
versus temperate river basins, for example). The policy and legislative framework will govern the purpose and effectiveness of the RBO.

Lessons learned

Experience shows that all RBOs evolve with time and see their composition and duties adapted from time to time reflecting the real needs of the moment.

Successful river basin organisations are supported by:

- An ability to establish trusted technical competencies;
- A focus on serious recurrent problems such as flooding or drought or supply shortages, and the provision of solutions acceptable to all stakeholders;
- A broad stakeholder involvement, catering for grassroots participation at a basin-wide level (e.g. through water forums);
- An ability to generate some form of sustaining revenue;
- The capacity to collect fees, and attract grants and/or loans;
- Clear jurisdictional boundaries and appropriate powers.



Case Study

The Sre Pok River Basin Council

This river basin organisation is among number of mechanisms that have already been set up in Viet Nam to promote the coordination among related organisations in utilization and management of water resources at river basin level. The Sre Pok River Basin Council in Viet Nam was established in 2005 under the Decision No. 41/2006/QD – BNN dated 25 May 2006 of the Minister of Agriculture and Rural Development to coordinate activities among 4 Central Highland provinces of Viet Nam named Dak Lak, Dak Nong, Gia Lai, and Lam Dong for exploitation, utilization, and protection of water resources of the Sre Pok River. The Sre Pok River Basin Council Office is located in the premise of the Provincial Department of Agriculture and Rural Development of Dak Lak Province.

The Sre Pok River Basin Council consists of one Chairman, who is also Chairman of the People's Committee of Dak Lak Province, 3 vice Chairmen from the People's Committees of Dak Nong, Gia Lai, and Lam Dong Provinces, respectively, the standing member who is a leader of the Provincial Department of Agriculture and Rural Development of Dak Lak Province, permanent members who are also high ranking representatives from Provincial Departments of Agriculture and Rural Development, Natural Resources and Environment, Planning and Investment, Finance, Water Resources, Disaster Prevention of the 4 Provinces, representatives from Department of Water Resources of MARD, Viet Nam National Mekong Committee, and Project Management Board No. 5 of the Electricity Corporation of Viet Nam, and some ad - hoc members. The budgets for operation of the Sre Pok River Basin Council are shared between the four provinces and from other mobilized sources.

The Sre Pok River Basin Council provides advices relating to water resources of the Sre Pok River such as: Strategies, policies on water use; river basin planning, water resources exploitation, utilization, and protection; prevention and mitigation of flood and flooding consequences; management, protection, exploitation, and utilization of trans-boundary waters within 4 provinces, and the downstream waters in accordance with international treaties, and recommendation of resolutions for differences and disputes if any.

>>> **SEE SESSION PLAN 4.1: THE ROLES AND FUNCTIONS OF BASIN AND SUB-BASIN OrganisationS**

>>> **SEE SESSION PLAN 4.2: IDENTIFYING BEST PRACTICE IWRM AT THE RIVER BASIN LEVEL**

Relevant material in other resources

Resource	Section
The Global Water Partnership (GWP) and the International Network of Basin Organizations (INBO) for use of: *A Handbook for Integrated Water Resources Management in Basins.*	Chapter 4
UNESCO IHP/WWAP/NARBO for use of: IWRM Guidelines at River Basin Level.	Part 1, Section 4.3
Cap-Net, *Integrated Water Resources Management for River Basin Organisations: Training Manual*, June 2008	Module 2

Session Plan

4.6 Session Plan 4.1: the roles and functions of basin and sub-basin organisations

OBJECTIVES

- To understand the differences in roles and responsibilities of basin and sub-basin organisations

MATERIALS

- This chapter of the Manual
- Paper, pens
- The following table:

TIME

- 30 minutes

PREPARATION

- Flip chart

Table showing relationships between types of basin organisations, scale and functions

	MACRO LEVEL: Policy/National/International	*MESO LEVEL: Implementation at national and sub-national/sub-basin scales*	*MESO/MICRO LEVEL: Operational*
Type of basin organisation	Transboundary (e.g.) commission	National, inter-state basin (e.g. commission, authority, association)	Local (e.g. land and water management group)
Basin management strategies and plans	Transboundary basin management agreement or plan; transboundary compact; national basin management plan	Sub-basin management plan or strategy, large sub-watershed or sub-aquifer or lake management plan	Local land and water management plan, storm water management plan, local planning scheme (administered by local government)
Level of decision-making	Highest political decision-making level, transboundary agreements	Province, state, district, territory (or national in small states)	Village co-operative, farm, factory, forest, local government, water use district
Natural resource system(see Figure 8.2)	Part of a geographical zone, such as a river, lake or aquifer basin	Regional or local ecological system of a lake, river valley within a basin, or sub-aquifer within a aquifer province	Areas with relatively uniform ecological and hydrological conditions

Source: Hooper 2005, p.120, adapted from Newson 1992

STEPS

1. **Divide into country groups** – with no more than 3 people per group
2. **Examine the above table;** reflect on this table with respect to the water resources management functions of your country.
3. **Prepare a list of specific functions** for the national agency in water resources management and a sub-basin organisation in your country.
4. **Specify the difference**s between these functions and those of the Mekong River Commission
5. **Prepare a short presentation** describing the functional differences between Mekong River Commission, national water resources management agencies and sub-basin organisations

Session Plan

4.7 Session Plan 4.2: identifying best practice IWRM at the river basin level

OBJECTIVES

- To understand six features of best practice IWRM at the river basin level and be able to identify examples of same

MATERIALS

- This chapter of the Manual
- Paper, pens
- Print outs, one for each person, of the following table (next page).

TIME

- 50 minutes

PREPARATION

- Flip chart - prepare charts for groups of participants to complete for columns B and C above

STEPS

1. **Divide into country groups** – with no more than 3 people per group
2. **Examine the table on the following page;** reflect on this table with respect to water resources management activities at the lower Mekong basin level by the Mekong River Commission.
3. **Complete columns** [b] and [c] on butcher's paper
4. **Report** back to the class with the results of your discussion

Best practice IWRM at the river basin level

[a] FEATURE	[b] STRENGTHS OF THIS FEATURE	[c] AN EXAMPLE YOU KNOW OF/or WHAT NEEDS TO BE DONE
[1] Operates in a ***stable institutional framework*** that overcomes fragmentation and overlap of responsibilities, and is supported by strong and comprehensive, but flexible legislation, regulations, decrees etc. This ensures "fairness" in basin-wide decisions and a process of accountability.	1. 2. 3.	1.
[2] Uses a ***strong knowledge base*** that derives from a good, uniform and comprehensive data network, systems and models for analysis, and that allows "knowledgeable" natural resources/water management policies and strategies to be developed and implemented.	1. 2. 3.	1.
[3] ***Integrates action*** across all natural resource issues, which means agencies do not find singular solutions but look at impacts and improvements across the spectrum of natural resources, and the development of regional (basin scale) natural resources management policies	1. 2. 3. 4.	1.
[4] Uses ***strong community awareness and participation processes*** – to enhance greater ownership of basin scale plans of action	1. 2. 3.	1.
[5] Has a ***strong foundation and mandate in legislation*** which clearly identifies its functions, structure and financial base and whose administration and operation is based upon a decision-making process of authority, responsibility and accountability.	1. 2. 3.	1.
[6] ***Is conceived in the reality of existing conditions***, where there are vested interests, attitudes and economic bases. Where reforms of the magnitude of river basin management are introduced or expanded, there is resistance to change and concern over infringement on administrative level and agency "turf", so a strategic planning and implementation process based on communications, coordination and cooperation within a river basin organisation is developed.	1. 2. 3.	1.
Source: Millington, P. Quoted in Hooper, 2005 (See references at end of Manual)		

Chapter 5
Management Tools: Participation, Stakeholder Engagement and Conflict Management

Parts of this chapter are drawn from the GWP IWRM Toolbox.

Management instruments are the elements and methods that enable and help decision-makers to make rational and informed choices between alternative actions. These include a wide range of methods, both quantitative and qualitative, based on disciplines such as hydrology, hydraulics, environmental sciences, system engineering, legal sciences, sociology and economics.

This chapter deals with three management tools: participation stakeholder engagement and conflict management.

5.1 Introduction to participation

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. Participation also occurs if democratically elected or otherwise accountable agencies or spokespersons can represent stakeholder groups (e.g. regional NGOs). The type of participation will depend upon the spatial scale relevant to particular water management and investment decisions and upon the nature of the political economy in which such decisions take place.

Participation requires that stakeholders at all levels of the social structure have an opportunity to participate in decision making processes. This can lead to impact on decisions at different levels of water management. Consultative mechanisms will not allow real participation if they are merely employed to legitimize decisions already made, to defuse political opposition or to delay the implementation of measures which could adversely impinge upon a powerful interest group. A participatory approach is the only means for achieving long lasting consensus and common agreement. However, for this to occur, stakeholders and officials from water and related agencies have to recognize that the sustainability of the resource is a common problem and that all parties are

The Mekong River Commission's rationale for Stakeholder engagement

The rationale for stakeholder engagement in the MRC is that through involvement of diverse stakeholders actively engaging in relevant and timely transboundary issues with the MRC, the MRC would increase its overall transparency and accessibility of information, build a trustworthy foundation for a stronger and broader recognition and support by the public, and enhance its decision making through access to relevant information and experience from local, national and regional actors outside the domain of the MRC. Furthermore, the MRC would build its reputation as a multi-stakeholder organisation that is led and managed by the four Lower Mekong Basin governments. Increased stakeholder engagement would aim to contribute to conflict prevention and sustainability of water resources development and management in the Lower Mekong River Basin. In accompanying its decision-making process with broader stakeholder engagement, MRC would enhance the ownership and regional coordination among a wider group of stakeholders and the MRC member countries.

going to have to sacrifice some desires for the common good. Participation is about taking responsibility, recognizing the effect of sectoral actions on other water users and aquatic ecosystems and accepting the need for change to improve the efficiency of water use and allow the sustainable development of the resource. Governments at all levels have the responsibility for making participation possible. This involves the creation of mechanisms for stakeholder consultation. However, governments also have to help create participatory capacity, particularly amongst women and other marginalized social groups.

>>> SEE SESSION PLAN 5.1: INTRODUCTION TO PARTICIPATION

5.2 Stakeholder and organisational mapping

Building ownership of water management processes among stakeholders of a basin is perhaps the primary challenge for any transboundary institution. A supranational management institution can foster ownership among riparian states. However, the regionalization of water management is likely to cause great concern among individual stakeholder groups. Under such circumstances it is critically important to engage regional-level civil society.

The appropriate engagement of all stakeholders and civil society groups in particular, is essential to build confidence, instil ownership and ensure the sustainability of transboundary water management processes.

Figure 5.1 provides an overview of the process of stakeholder identification and engagement that can be applied at various levels of transboundary river basins, from the local to the regional level (while recognizing that there are overlaps and interdependencies at different levels). This is aimed at ensuring that all stakeholders within the transboundary river basin are identified and engaged effectively in transboundary river basin management.

Explanation of stakeholder of groups

Group A - Least influence, most importance
Includes those living in the project area. May not include all members of the community, as some may be powerful and influential people. May include local governments that have little power to influence resource management decisions. This is the most critical group and will need careful attention during the participation process.

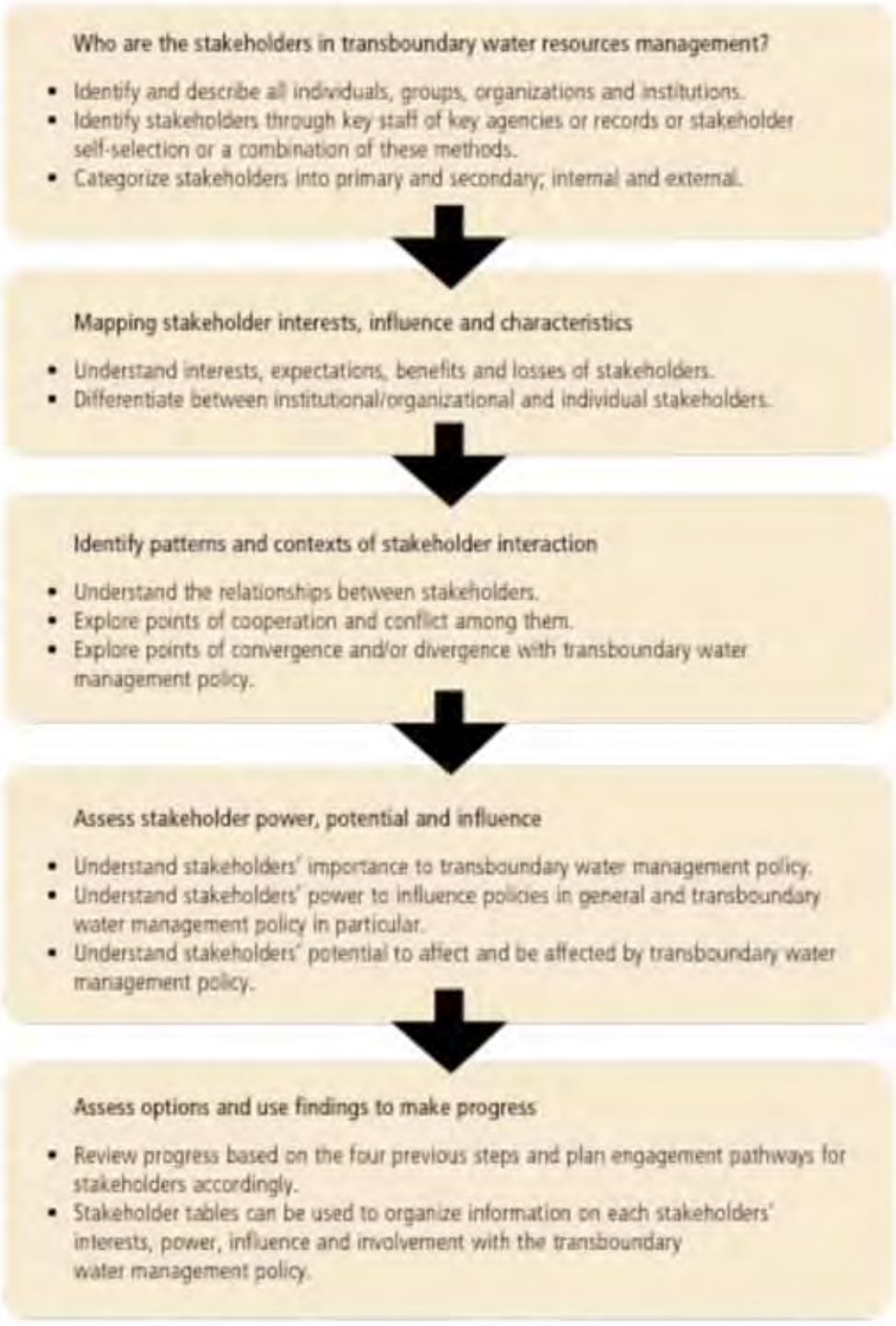
Group B - Most influence, most importance
May include the powerful ministry responsible for the project, party members who have strong influence in a single party state, developers who are the main investors and so on. Good working relationships between this group and the MRC will be necessary but the participatory process should aim to balance their power with especially those in Group A.

Group C - Most influence, least importance
This will include donors or agencies that have strong influence in planning and finance or mobilisation of people. May include mass organisations. They should be fully informed and able to share their ideas. They may represent considerable risk and will need careful monitoring and management.

Group D - Least influence, least importance
These are various groups who have low stakes in the project. They may include groups with people who are marginally affected and are project beneficiaries or collaborators. They require only limited involvement in the participatory process but should be kept informed and are given the opportunity to make queries about project details.

Assess type of participation
The type of participation describes how the stakeholders are linked to the participatory process, depending on their respective influence and importance. A different matrix using the four levels of public participation can be drawn up to differentiate the stakeholders according to intensity of participation. For example, Group A stakeholders should be linked in to all stages of the participatory process and have influence over decision-making. In addition, notwithstanding which group of stakeholders the National Mekong Committees fall into according to the analysis, they should be involved in the various participation activities during the full project cycle.

Figure 5.1: Steps for stakeholder identification, stakeholder mapping of interests and assessment of the process



(Extracted from: Sadoff, C., Greiber, T., Smith, M. and Bergkamp, G. (2008). Share – Managing water across boundaries. Gland, Switzerland)

Stakeholder definitions

A stakeholder is an individual, group or institution that has a defined and recognised interest, or stake, in a decision making process or project. Such interest may be economic, cultural, recreational, religious, geographical or otherwise described. Stakeholder may be defined by whether they will be affected by a decision or have some influence on its outcome (as described above).

The most important stakeholder in the Mekong River Basin is its people and more specifically those that are either directly or indirectly affected, including those marginalised groups who are affected but have no voice or may be invisible, both positively or negatively by water resources development. This group of stakeholders is considered key to the developments in the Mekong and the work of the MRC and more specifically to the process of the BDP2.

Stakeholders can be broadly categorised into the following groups:

Directly affected people: These are both individuals and groups of people at the local level who are affected by development activities both positively and negatively. The affected groups in the Lower Mekong Basin include workers, farmers and fisher folk who depend on river resources for their livelihoods as well as those that benefit from hydropower and irrigation development and navigation improvement in the Lower Mekong Basin. Minorities, poor people and women are also included in these groups because they tend to be most vulnerable in that they have the least political power to inform and access planning and decision-making processes.

Indirectly affected people: People that live nearby and/or use resources from project areas. They may also include people who trade occasionally with directly affected peoples.

Non-governmental organisations (NGOs): Groups working at local, national and regional levels. NGOs can be divided into several different types including: development-oriented, advocacy, research, and non-profit associations. NGOs implement research, design and development projects and carrying out advocacy to influence decision-making around water-related resources in the Lower Mekong River Basin. These groups come from a number of sectors such as environment, water, nutrition, community development, and humanitarian among others. Some locally based NGOs may be representatives of directly affected people and those operating on other levels may have interests in project/programmematic directions. For example, World Wide Fund for Nature (WWF) regularly works with the MRC at the programmematic and governance levels.

Academia, research and scientific institutions: These stakeholders conduct research on a range of environmental and social issues applicable to the sectors MRC is working to address. They can provide a valuable resource of information to the MRC particularly for the programmes but to also aid in higher level decision-making based on scientific information. For example, the International Water Management Institute (IWMI) and the World Fish Centre (WFC) are working directly with MRC programmes.

The **private sector** includes project developers or investors both from the region and outside the region who are either directly investing in a project or interested in investments which would become feasible or profitable if a project goes ahead. They are generally focused around the sectors of hydropower, irrigation and agricultural expansion, mining, and tourism among others and include financiers.

The **Donors (Development partners)** play a significant role in consultations on the direction of the MRC and have interests in integrated sustainable development in the region. The donors may be both programme or project funders and play a role in the monitoring and evaluating of the MRC.

International organisations: United Nations (UN) agencies, ASEAN, IUCN, among others, are major stakeholder groups that works with the MRC. UN agencies are often regional stakeholders who can influence or play a significant role in regional and/or national water and related resources policies and programmes. This may be through technical assistance to

line agencies, by accessing decision-makers or through other inputs.

River Basin Organisations (RBOs). Where RBOs exist in a country (e.g. Thailand and Viet Nam), they can play an important role in sub-basin planning processes.

Dialogue partners. China and Myanmar are dialogue partners with the MRC and provide important data for scientific studies as well as to enhance decision-making.

>>> SEE SESSION PLAN 5.2: STAKEHOLDER IDENTIFICATION AND ANALYSIS

>>> SEE SESSION PLAN 5.3: INSTITUTIONAL AND ORGANISATIONAL MAPPING AND ANALYSIS

Identifying stakeholder principles

Identifying stakeholder principles is an important component of ensuring participation within IWRM. Stakeholder principles should be flexible and actual modalities will differ depending on the level of engagement among stakeholders. The principles should respond to different conditions depending on the nature of issues and decisions being discussed; participants' knowledge and experience; and existing support and procedures for participation.

Key principles related to the Mekong River Commission include:

Representation: Representation should include processes that promote social equity, ensure gender balance and enable the interests and needs of affected peoples to be taken into consideration. A major forum for representation of directly or indirectly affected peoples is through the BDP2 Sub-area forums. Opportunities should be provided for the interest and needs of the poor to be taken into consideration.

Transparency: In order for stakeholders to effectively engage in MRC activities all relevant LMB water-related information produced by the MRC should be fully and clearly communicated to stakeholders in line with the MRC Disclosure Policy.

Accessibility: Accessibility will mean timely distribution of information that is presented in non-technical, easily understood terms and translated into the four riparian languages of the member countries of the MRC. Information should be easily accessible through the MRC website and listserves as well as through regional networks to ensure timely distribution of information. To ensure an accountable process, MRC will follow its Disclosure Policy setting out the administrative rules and regulations on access to data, information and knowledge held by the MRCS and the materials available. MRC documents that meet the criteria for disclosure will be made available to the public through a number of sources, including the corporate website. Ideally, MRC focal points at the MRCS and NMCSs will be responsible to communicate to stakeholders.

Practicality and effectiveness: The MRC recognises that other regional and national networks exist and processes are already established in the Lower Mekong River Basin. Efforts will be made to build on these networks in order to ensure outreach and engagement with a wide range of stakeholder groups. This would translate into greater regional cooperation and further reach among stakeholders.

Relevance: The role of MRC needs to be clearly articulated to stakeholders so that they fully understand the working parameters of the Commission. Furthermore, stakeholder engagement in 'real' issues facing the Mekong River Basin is essential to effective processes and there should be mutual benefit for both the MRC and stakeholders. MRC should ensure that issues are presented in a timely manner and relevant to the stakeholders of the Basin.

Realistic and efficient: Resources are frequently limited for carrying out stakeholder engagement activities in governance, programmes, projects and activities of the MRC. Stakeholder involvement should be designed and implemented in a manner to use resources effectively and efficiently, taking into consideration available information, time

and financial resources, as well as participant capacity. MRC should also place importance on the complementary and coordinated actions between the MRC Secretariat (e.g. the programmes, BDP2 and governance level) and the NMCs.

Accountability: Ensuring mutual accountability between the MRC and its stakeholders is essential. This stakeholder principle emphasises the need for not only the MRC to uphold to the stakeholder principles and mechanisms for stakeholder engagement but also for stakeholders to ensure and enable constructive engagement within the MRC that contributes to the overall objectives of the 1995 Mekong Agreement. Therefore it should be clear that all stakeholders understand the abilities and limitations of the MRC and its mandate through the 1995 Mekong Agreement and look for ways to strengthen MRC activities and actions. Accountability of all actors should be mainstreamed throughout engagement activities.

Timeliness: Stakeholder participation should be integrated as early as possible in the formulation of MRC programmes, projects and other activities as well as at the highest level of decision-making in the MRC Council and Joint Committee. Participatory approaches should be employed throughout all stages of MRC activities.

5.3 Consultation and participation in decision-making

Typology of meetings

Identifying the correct type of meeting is essential when thinking through what kind of participant one wants to engage. There are a variety of intentions, structures and modalities for meetings. Below are a list of the types of meetings conducted in the Mekong and their intended purpose. Use this information as a guide when deciding your purpose for a meeting.

Conference: A highly structured, moderated meeting where various participants contribute following a fixed agenda. These are usually used for the purposes of exchanging of information or discussion or consultation. These types of meetings are generally large in nature with 80 participants.

Consultations: A meeting or conference at which advice is given or views are exchanged about a certain issue. For example this may refer to a consultation on a programme document, strategy or policy. Consultation are organised in a manner in which participants are enabled to provide input in a variety of mechanisms either verbally, in a written form (such as using coloured cards), in small group discussions or through written input (e.g. posting of a policy on the internet to receive feedback). Examples: BDP2 Stakeholder Consultation and Hydropower Consultation.

Dialogues: The term Dialogues is often synonymous with the multi-stakeholder platform conception.[4] Dialogues can be large or small in nature with the goal towards sharing of information in a respectful, trustful and safe space. Dialogues can also be used to negotiate an outcome but do not have to in all cases. (See broader definition under MSPs).

Forums: A public meeting or assembly for open discussion. Generally these are large in nature 80+ people on a specific topic. For example, the Climate Change Forum held by the Mekong River Commission enabled a large group of people to share their work and ideas about climate change in the Mekong Region in open discussions. Similarly the Annual Flood Forum provides the same opportunities.

Roundtables: Smaller platforms or dialogues with 20-30 people on specific topics of discussion. These may be used to convene stakeholders to actively input into a specific issue, seek a solution, prioritise a work plan, etc.

Seminars: A structured meeting with an educational purpose. Seminars are usually led by people with expertise in the subject matter.

Workshops: An educational seminar or series of meetings emphasising interaction and exchange of information among a usually small number of participants. Examples include

4. Dore J (2007) 'Mekong Region Water-Related MSPs-Unfulfilled Potential' in Warner J (ed.) Multi-Stakeholder Platforms for Integrated Water Management, Ashgate.

writing workshops, work planning workshops, etc. Example: Regional Meeting on Discharge and Sediment Monitoring.

Multi-stakeholder platforms (MSPs): MSPs are an approach for constructive engagement and learning about complex problems where facts and values may be in dispute. MSPs are a part of governance where stakeholders are identified, and usually through representatives, invited and assisted to interact in a deliberative forum that focuses on: sharing knowledge and perspectives, generating and examining options, informing and shaping negotiations and decisions[5] but do not always result in a negotiated outcome. An MSP may involve regular meeting between core participants; conferences/discussions open to the wider public, locally hosted field visits, electronic exchanges, and government briefings.

Do it well or don't do it at all…

Multi-stakeholder platforms usually lack a mandate, and resources for concrete collaborative action are constrained by local power differences. In addition they take a very long time to develop "ownership". Multi-stakeholder processes do not necessarily solve problems, but they do help disputing parties to understand at least partly other stakeholders' views and interests. Those involved have stressed repeatedly the crucial importance of the process itself in low-trust societies such as post-violence, post-dictatorship, post apartheid societies.

People may not necessarily come to the table to learn or to bargain, but they find it very valuable to hear about what is going on. However, providing only political space to different stakeholders is usually not enough. Training, empowerment and working towards quick wins are necessary to keep people motivated. "Third parties" such as local and external knowledge brokers can play an important role in this effort.

For multi-stakeholder processes to be effective:

- Make sure to get "food on the table" (quick results that most stakeholders value), otherwise participants or other people will drop out. Multi-stakeholder platforms are slow to grow and quick to die.
- Pay attention to the small things such as accessibility (providing transport), translation service, and training. One cannot ensure a level playing field but it helps to provide practical support. However, several actors will find it more advantageous not to participate or to mix in. Multi-stakeholder platforms do not cut out politics; they are an integral part of it!
- Do it well or don't do it at all – don't raise unrealistic expectations, or people will feel cheated and will not co-operate next time." – P. Bindraban, M. Silvius and others, 2005, Switching Channels: Challenging the Mainstream, The Netherlands Water for Food and Ecosystems Programme; www.waterfoodecosystems.nl

(Extracted from: IUCN, TEI, IWMI, and M-POWER, 2007. Exploring Water Futures Together: Mekong Region Waters Dialogue. Report from regional Dialogue, Vientiane, Lao PDR. 75pp.)

5. Dore J (2009 forthcoming) 'Multi-Stakeholder Platforms' in Smith M, Dore J and Robinson J (eds.) NEGOTIATE: Overcoming Power Differences in Water Management Negotiations.

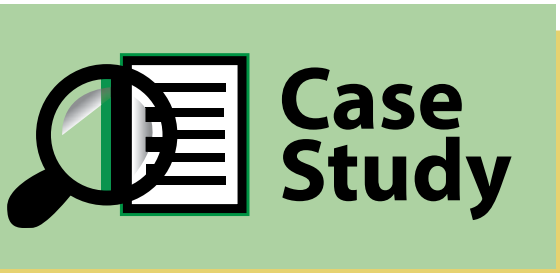
Key characteristics of MSPs:

Multi-Stakeholder Platforms (MSPs) or Dialogues

- **Actors with either a right, risk or general interest are identified**
- **Usually through representatives, invited and assisted to interact in a deliberative forum**
- **Aiming for all participants to learn and understand alternative perspectives**
- **Possibly negotiate workable strategies and agreements**

Desirable Context	Desirable Process	Desirable Outcomes
• Well intentioned • Clear purpose and scope • Sufficient political support • Sufficient time • Sufficient resources • Appropriate levels and scales	• Inclusive • Facilitated • Ethical • Visionary and focused • Holistic • Informed • Deliberative • Communicative	• Options assessed • Rights, risks, responsibilities established • Increased understanding • Workable agreements • Discursive legitimacy • Constructive influence

Source: J. Dore, "Mekong Region MSPs: Unfulfilled potential or sideshow?" in J. Warner (ed.), Multi-stakeholder Platforms: Democratising Water Management, 2007, London, Ashgate



Exploring Water Futures Together

Characteristics

In July 2006, the International Union for the Conservation of Nature (IUCN), the Thailand Environment Institute (TEI), the International Water Management Institute (IWMI) and the Mekong Programme on Water Environment and Resilience (M-POWER) water governance network convened the Mekong Region Waters Dialogue: Exploring Water Futures Together.

As a multi-stakeholder platform, the Dialogue was a process through which various individuals and groups in the Mekong Region who are affected by issues related to water were able to enter into discussions aimed at fostering collective learning and forging well-informed, participatory decision-making on water governance issues in the region.

The objectives of the Dialogue were:

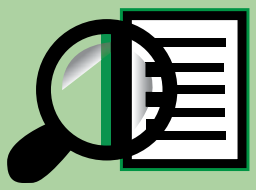
- To provide opportunity for state, civil society and business actors in the Mekong Region to participate in water development dialogues – to inform and be informed;
- To assess national water resources development strategies, and the relevant regional strategies of the Mekong River Commission (MRC), Asian Development Bank (ADB) and the World Bank; and
- To enable the articulation of different perspectives about water-related development in the Mekong Region for consideration in decision-making.

Some 160 participants involved in water resources development in the countries of the Mekong Region attended the Dialogue. The participants comprised of senior and middle-management representatives of the MRC, ADB and the World Bank, government representatives from water and related line agencies, private sector representatives, policy consultants and advisors, members of the academe as well as activists from non-governmental organisations and local groups.

The participants were motivated to attend the Dialogue as they felt that they have a stake in the way in which transboundary water in the Mekong is managed. Current structures do not allow for all stakeholders to be a part of a process to determine the ways in which the water and its associated benefits are managed.

Lessons learned

- Dialogues need to occur on multiple scales – regional, national, provincial and local. The Mekong Region Waters Dialogue was the first stage in a series of multi-stakeholder processes initiated by the conveners at the region level. However, the organisers recognise that only a limited number of people can participate and thus needed to include national dialogues in local languages in the Mekong countries.
- Dialogues are not one-time events. They need to be initiated over long periods of time, at least three years, to be effective. Momentum needs to be built for engagement and trust among stakeholders is very important.
- Ensuring relevant information pertaining to the dialogue topics needs to be provided and ideally placed in the public domain ahead of time so that participants have enough time to digest information for effective engagement. Use of local language (e.g. in translation of document and simultaneous translation of sessions), is essential.



The World Commission on Dams

Don't plan, build, protest, operate, decommission, propose, oppose or discuss a dam without it! By 2000, the world had built 45,000 large dams to irrigate a third of all crops, generate a fifth of all power, control floods in wet times and store water in dry times. Yet, in the last century, large dams also disrupted the ecology of over half the world's rivers, displaced over 40 million people from their homes and left nations burdened with debt - Earthscan advertising material promoting the WCD report.

The World Commission on Dams (WCD) was a high-profile MSP which emerged from increasing public criticism of large dams. It aimed to undertake a rigorous, independent review of the development effectiveness of large dams, to assess alternatives and propose practical guidelines for future decision-making. The WCD attempted to conduct an ideal deliberative multi-stakeholder learning process. Government participated, but with the same standing as civil society. There were many actors involved at the local, regional and international level – dam 'practitioners', economists, sociologists, ecologists, political scientists and the media. The process received enormous publicity and international recognition. In its own words it "provided a unique arena for understanding complex choices facing societies in meeting their water and energy needs".

The WCD commissioners produced a 'consensus' report, an informed and negotiated contribution, which was launched in a blaze of publicity in 2000, evoking a range of responses.[6] The 'WCD decision-making framework' has since been evaluated for use as both an implementation and advocacy tool. It is complex. The framework includes 3 grounding global norms, 5 core values, 5 key decision points, 7 strategic priorities, 33 associated policy principles, and 26 guidelines.[7] The task of trying to figure out how to combine these pieces of advice remains a challenge for post-WCD activity.

Following the release of the WCD report there were numerous follow-up activities, including MSPs, undertaken around the world. The Dams and Development Dialogue in Nepal[8] is just one example where diverse stakeholders assembled and persisted over several years to explore sensitive large dams issues in the Nepal context.

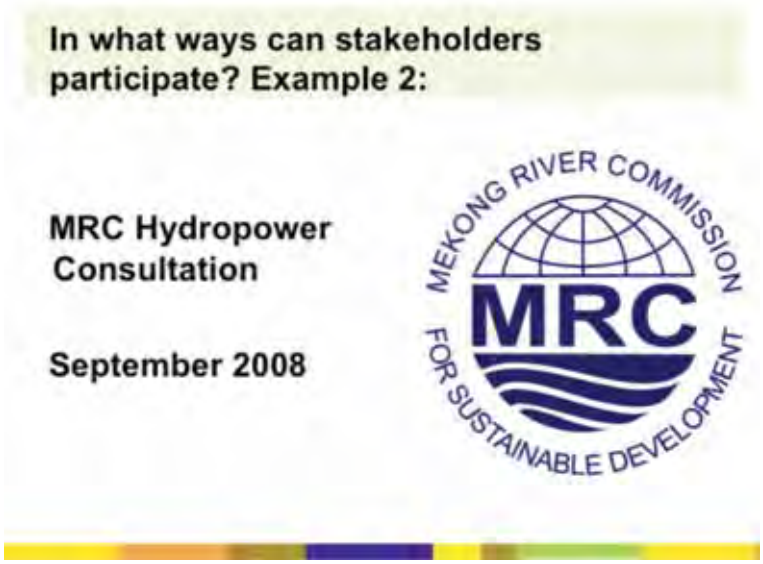
Source: NEGOTIATE

Case study record of a public participation tool - MRC Fisheries Programme

Type of problem to solve	**Enhancing public awareness**
Description of the situation	Developing a mechanism for stakeholder engagement around critical fisheries issues. The Fisheries Programme (FP) at the MRC established the Technical Advisory Body (TAB) that acts primarily as a steering committee but also provides technical input into the core work of the programme.
Problems encountered	In response to concerns in the Basin about widespread hydropower development along the mainstream of the Mekong and potential fisheries impacts, the FP needed to find a mechanism to provide sound scientific information and global learning to understand the real impacts in the Mekong.
Measures taken to overcome the problem	FP established an Expert Working Group comprising internationally renowned experts on dams and fisheries from around the world to provide advice on the current status of scientific knowledge on specific technical issues. The Expert Working Group presented their findings at a multi-stakeholder Hydropower Forum in September 2008. This information was provided to the MRC governments to aid in their decision making around moving forward with Mekong mainstream dams.

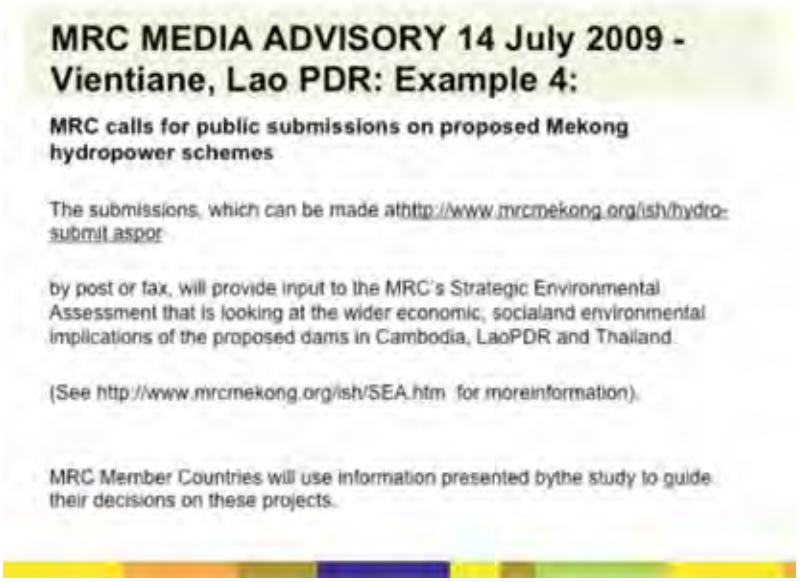
6. There was a huge knowledge base assembled and debated by the WCD platform which informed the final report of the Commissioners (WCD, 2000). All reports including, details of the process, can be found online at www.dams.org. Critiques abound, but any reviewer of this process should include (Dubash et al., 2001).
7. (Dore et al., 2004).
8. (Dixit et al., 2004).

Example 1 shows a multi-stakeholder platform in the Mekong Region organised by civil society organisations



Example 2 shows a consultation on hydropower organised by the Mekong River Commission

Example 3 shows a Public Forum on the MRC website. A specific comment period was set-up to obtain information.



Example 4 shows a web call for input via the Mekong organised by Thai NGOs

Examples of participatory events in the Mekong Basin. In example 1, 2 and 3 the same information was shared and discussed but in very different formats. The first case was a multi-stakeholder platform open to all interested actor covering the Mekong Region. Emphasis was placed on dialoguing with each other. The second example focused specifically on hydropower and was designated a consultation by the MRC to obtain information and feedback on their new Hydropower Programme. The third example was a Public Forum on the Mekong organised by Thai NGOs to discuss Mekong mainstream dams. The event included a number of affected people and diversity of civil society groups. Other actors such as government, MRC and donors were invited to present.

>>> **SEE SESSION PLAN 5.3: INSTITUTIONAL AND ORGANISATIONAL MAPPING AND ANALYSIS**

5.4 Conflict resolution in water resources management

This material is drawn directly from GWP's Toolbox on IWRM:
www.gwptoolbox.org

Procedures for consensus building and conflict management are central to successful IWRM. Conflicts can occur for many reasons. Areas for potential conflict include: interdependence of people and responsibilities; jurisdictional ambiguities; functional overlap; competition for scarce resource; differences in organisational status and influence; incompatible objectives and methods; differences in behavioural style; differences in information; distortions in communications; unmet expectations; unmet needs or interests; unequal power or authority; misperceptions, and others.

Conflicts are inevitable in IWRM but need not end in polarisation or impasse. Conflicts can also be positive.

For example, conflicts may help in:

- Identifying real problems needing solutions;
- Bringing about needed change;
- Permitting adjustments to be made without threatening the basis of a relationship;
- Helping to build new relationships;
- Changing the way we look at issues, clarifying purposes and identifying what is most important.
- Identifying what is most important.

Conflict management refers to a broad array of tools used to anticipate, prevent, and react to conflicts. Which tool to select depends on the root causes of the conflict, as well as its type and location. Conflict management tools can be classified into three types: interventions for conflict management, decision support/ modelling tools and tools for consensus building.

A conflict management strategy will involve a combination of these types of tools. In most water resources cases the tools encourage parties to move beyond positional bargaining and the claim/counter claim process. They try to help parties identify which interests lie behind each side's position, and to jointly construct "win-win" solutions based on meeting those interests. It must be stressed, however, that not all situations can be resolved with win-win outcomes - at least not in the short term. Trade-off and compromise is often the necessary outcome. Conflict management involves both social change and social learning. It has many benefits, including its voluntary nature. It can develop quick procedures and solutions to dispute settlement, more control over solutions by those closest to the issues, greater flexibility for crafting solutions than is offered in formal legal mechanisms and time and cost savings.

These tools are applicable in almost all aspects of IWRM. They are especially useful in early stages of IWRM planning and design. They are least useful in situations where major legal precedent is being set.

It is most important to stress that the ultimate mechanism for conflict resolution is the law and legal procedures. This section focuses on voluntary mechanisms for conflict management, but in many cases beneficiaries of these techniques would not participate without the knowledge that there is ultimate recourse to compulsory adjudication.

Use the following three session plans to experience some conflict resolution procedures.

>>> SEE SESSION PLAN 5.4: MAIN CONFLICT INGREDIENTS
>>> SEE SESSION PLAN 5.5: CONFLICT MANAGEMENT 'WARM UP'
>>> SEE SESSION PLAN 5.6: DEVELOPING NEGOTIATION SKILLS

Relevant material in other resources

Resource	Section
The Global Water Partnership (GWP) and the International Network of Basin Organizations (INBO) for use of: *A Handbook for Integrated Water Resources Management in Basins.*	Chapter 6
Cap-Net, *Integrated Water Resources Management for River Basin Organisations: Training Manual*, June 2008	Module 4

Session Plan

5.5 Session Plan 5.1: introduction to participation

OBJECTIVES

At the end of this session the participants will be able to:

- Understand the concept of participation.
- Introduce the different levels of participation.

MATERIALS

- Flip charts
- Marker pens
- Masking tape
- Coloured cards
- Handout 1: Examples of participatory activities in the Mekong Basin
- Handout 2: Types of Participation

TIME

- 90 minutes

PREPARATION

- Cut out the participation levels (Handout 2) from the handout and ensure there are enough equal amounts for your group
- Prepare presentation of examples of participation at different levels in the Mekong Basin or in your country (refer to Handout 1 as an example).
- Prepare two coloured cards: one with "highest level" and one with "lowest level". Place them across from each other on the floor using tape. Ensure enough space between the two to accommodate all the participants in the class who will be standing on an imaginative ladder.

STEPS

1. **Explain the purpose of the activity.** Ask participants what they understand by the term "participation" in the context of IWRM. Write the definitions on coloured cards and talk through each one. There will be multiple definitions of participation identified. Clarify any confusion.
2. **Remind** participants of the discussion on what a "stakeholder" is in the context of IWRM.
3. **Present multiple definitions** of participation. See Session Support Material 1.
4. **Using a PowerPoint presentation,** present examples of participation at different levels in the Mekong Basin or in your country. See Handout 1 as an example.
5. **Break the group into pairs.** Explain that the group will receive a piece of paper (Handout 2) describing a level of participation (generally). The participants will need to carryout the following tasks:
   - Without sharing your paper with anyone else find all the other participants with the same level of participation (this can be done by simply asking another person if they have 'manipulative participation or passive participation or….').
   - When the participant finds their partners, they need to read the definition and discuss the meaning of this level of participation. The trainer should circulate among all the groups to ensure that they understand the terms used.
   - Each group will need to think through an example from their type of participation listed on their paper. It can be an example that one of the group members has been a part of or it could be a hypothetical case.
   - The groups will then need to get into a line from lowest level to highest level of participation. This needs to be done by sharing your level of participation and talking through with others to determine where you fit on the ladder of participation - whether you are highly engaged or present a low level of participation.
   - When all groups are standing on the ladder, each group will to present (from highest to lowest) why they think they are in the position on the ladder, discuss with the rest of the group if it is the correct position and present their case example 2-3 minutes each. The case presented can help determine whether the group is in the right spot on the ladder.

Session Support Material

Examples of 'what is participation' according to the GWP toolbox:

- Participation takes place when stakeholders are part of the decision-making process
- Participation requires that stakeholders at all levels of the social structure have an opportunity to participate in the decision-making process
- A participatory approach is the only means for achieving long lasting consensus and common agreement
- It is about taking responsibility, engaging and informing.

Types of Participation:

Manipulative Participation	Participate is simply a pretence (fake/pretending).
Passive Participation	People articulate by being told what has been decided or has already happened. Information shared belongs only to external organisations/ officials.
Participation by consultation	People participate by being consulted or by answering questions. People participating have no share in decision-making. There is no obligation to take any of the comments forward.
Participation for material incentives	People participate in return for food, cash or other material incentives. Local people have no stake in the activity when the incentives end.
Functional participation	Participation is seen by external agencies as a means to achieve project goals, especially reduced cost. People may participate by forming groups to meet predetermined project objectives.
Interactive participation	People participate in joint analysis, which leads to action plans and the formulation or strengthening of local groups or institutions that determine how available resources are used. Learning methods are used to seek many opinions.
Self-mobilisation	People participate by taking initiatives independently of external institutions. They develop contacts with external institutions for resources and technical advice by retaining control over how resources are used.

Session Plan

5.6 Session Plan 5.2: stakeholder identification and analysis

OBJECTIVES

- To introduce a visual approach to the identification and assessment of dependency and power of different stakeholders in IWRM.

MATERIALS

- Flip charts
- Marker pens
- Coloured poster paper
- Glue Sticks

TIME

- 90 minutes

PREPARATION

- Cut several circles of at least six different sizes out of the coloured poster paper. Circles of the same colour should be the same size. Cut out triangles of different sizes (again, triangles of the same colour should be the same size). Prepare enough of both so that each group can have several circles and triangles of different sizes and colours.
- Prepare a flip chart from the *Stakeholder diagram example*.

STEPS

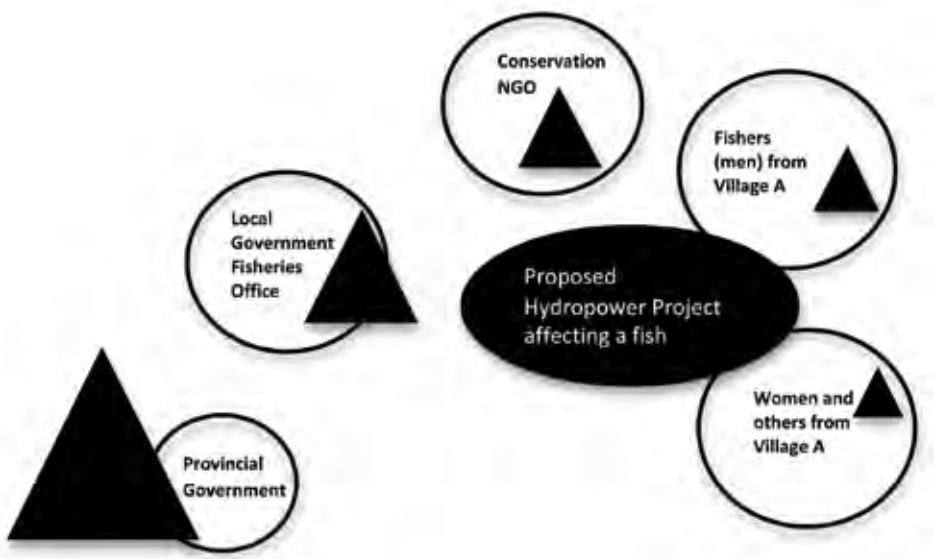
1. **Explain** the purpose of the activity. Ask participants what they understand by the term "stakeholder" in the context of IWRM. Clarify any confusion.
2. **Post and explain** the *Stakeholder diagram example* on the flip chart. Briefly describe the IWRM example and how the diagram depicts the different stakeholders, their interests and their relative power.
3. **Explain** that participants, working in small groups, will undertake the following activity"
   a. Each group should first select an issue they want to work on.
   b. They should then discuss and list all the stakeholder groups for that issue.
   c. Next, the group members should use one of the coloured circles provided to represent each stakeholder group (by labelling the circle). They should choose a circle size to represent the relative interest or stake of the stakeholder group. To determine this stake, it is useful to consider how affected the stakeholder group is by the issue or its outcome. For example, a large circle indicates that the stakeholder group is greatly affected by the issue and will be significantly affected by the outcome. A small circle, on the other hand, indicates that the stakeholder group is not affected as much.
   d. Glue the circles to a piece of paper with the issue stated in the centre. Use distance from the centre and from each other to depict the relative "closeness" (not geographic) of the stakeholder to one another and the issue.
   e. Once they are satisfied with their stakeholder interest circles, the group members should discuss the relative power that each of these stakeholder groups has to influence the outcomes of the issue.
   f. Choose a triangle that represents the relative influence of each stakeholder group (the bigger the triangle, the more power the group has to influence the outcomes of an issue). Glue this on top of the appropriate circle (overlapping).
   g. Once they are satisfied with their diagram, group members should discuss, and then mark with a (*), those stakeholders that they feel are the primary stakeholders who should be involved in managing the conflict.
   h. At the end of the activity, each group should have a piece of flip chart paper depicting the issue, with circles and triangles representing the stakeholder groups and their relative interest and influence. Each group should be prepared to present and explain its results to the other groups.

4. **Divide** the participants into groups, distribute flip charts, circles and triangles and glue sticks to each, and ask them to begin the activity.
5. At the end of one hour, **ask each group** to present and explain its results briefly.
6. **Initiate** a discussion around:
   a. What does this tell us about stakeholders and power and influence in IWRM?
   b. Where there any disagreements about who were and who were not legitimate stakeholders? How might identification of stakeholders change depending on the group involved in the analysis?
   c. How did the groups determine primary stakeholders? What criteria were used?

Stakeholder diagram and example

A proposal is being put forward for a large hydropower project located in a village (village A). Members of a conservation NGO are operating a fish conservation zone project in village A. The new hydropower project would provide a barrier for fish to reach village A's fish conservation zone and impact of the subsistence livelihood. The government is supportive of the project which will generate much needed electricity for the province and income. The following diagram illustrates how the members of village A viewed the stakeholders to this water resources conflict. It presents how they defined the different stakeholders, their views on how affected those stakeholders were by the outcome of the government decision, and their own relative power to influence that decision. The men of village A, who traditionally fish on the river, were seen as being the group that was most affected by the proposed decision, yet they had the smallest input into decision-making processes. Both the women and other members of the village A felt disadvantaged because they predicted a reduction in overall family income from fisheries and job losses such as river patrol. Overall the women were seen as less powerful because they did not participate in some of the consultation meetings held by the water resources agency. They had significant fears about the affect on the villages overall family income. The conservation NGO, which was providing technical advice on management of the fish conservation zone to the local village as well as to the local government fisheries department on which the government relied for financial support. However the decision for the hydropower project was not made at the local level but at the provincial in collaboration with the central government. The provincial departments were seen as the most influential in determining the decision. The conservation NGO was on the side of the local government and village A but could not take a position on the hydropower project out of fear of repercussions to their project.

The size of a stakeholder's circle and its proximity to the issue indicate the extent to which that stakeholder group is considered to be affected by the outcome of the conflict. The size of a stakeholder's triangle indicates the relative power that the stakeholder group has on the final management decision. The proximity of stakeholders to one another indicates the relationships and alliances among the groups.



Session Plan

5.7 Session Plan 5.3: institutional and organisational mapping and analysis

OBJECTIVE

- To build understanding on the role of institutional assessment and to practice using a tool for institutional analysis in IWRM.

MATERIALS

- Flip charts
- Coloured markers
- glue sticks

PREPARATION

- Coloured poster paper cut into circles of different sizes – one mixed set per group (about 25 circles of different sizes and colours each).
- A resource person to provide an overview on institutions and organisations in IWRM.

TIME

- 2 hours

STEPS

1. **Explain the objective of the session** and provide a brief background on the importance of understanding institutional roles and frameworks when planning IWRM. Point out that existing institutions play important roles in IWRM and an organisational mapping and analysis.
2. **Post the prepared definitions of Institutions and Organisations** (see Session Support Materials 1) and briefly discuss this difference explaining that there is often confusion over these terms. Make sure that the importance of both formal and informal institutions as well as the issue of institutions operating at different 'levels' (community to national/regional/international) is discussed. If necessary use a resource person to provide this overview.
3. **Explain** that there are, broadly speaking, three types of roles played by institutions in IWRM:
   - **Enabling Institutions** – facilitating relationships, formulating policies, building capacity
   - **Delivery Institutions** – providing extension services, technical support, inputs as needed
   - **User Institutions**– direct beneficiaries of the programme

   Point out that each of these institutions can exist within the government, private sector and civil society.

   Also point out that an institution can have multiple roles depending on the stage of the IWRM process, the size/mandate of the institution, etc. Spend some time discussing and clarifying these roles with the group.
4. **Explain** that we will be using a two-stage process for organisational mapping – identifying the relevant institutions and their inter-relationships and, understanding their roles in IWRM, using the following small group process:
   - Each group will be given a set of coloured circles and a glue stick.
   - At the centre of a flip chart, they should note the IWRM programme or process that they want to map out.
   - The coloured circles should be used to denote institutions or organisations that are relevant to the IWRM process/programme – a larger circle depicting greater relevance.
   - Once they have assigned different circles to different institutions, they should label these and stick these around the central issue on the flip chart.
   - They should use connecting arrows of varying thickness to show the relationship and the intensity of relationship between the different institutions.
   - Once they have completed this, they should assess each of the key institutions in terms of their potential role in IWRM, filling out the details of each role in the corresponding box as shown in the matrix on the next page.

	Enablers	Deliverers	Users
Institution A			
Institution B			
Institution C			
Etc.			

5. **Divide the participants into groups,** distribute the set of coloured circles to each group and give them 45 minutes to complete the task.

6. Once all groups have finished, **ask them to post their results** (both the institutional map and the table) and discuss them along with the following guiding questions:
   - What are the differences and similarities in the institutions identified by the different groups?
   - Would this change if different stakeholders were asked to do the same exercise? In what way?
   - To what extent did the groups identify existing institutions which could play a role in IWRM? What does this mean in terms of setting up new institutions focused on implementing IWRM/using an IWRM approach?
   - Are there similarities between the roles assigned to similar institutions by the groups or are these different? If they are different, what does this imply?

Trainers notes:

- It is important that participants understand the number and diversity of existing institutions in most situations – and question how each can collaborate together on IWRM (which cross-sects many institutions).
- Try to bring in the role of the private sector if relevant – this need not always be a negative role as is often perceived.

Session Support Material

Organisations are distinctive bodies set up to achieve a particular purpose

Institutions are sets of structured behaviours and relationships guided by certain norms of conduct (or rules) and put into practice by organisations

Institutions encompass organisations but also the enabling environment of policy, law and customs within which they operate

Session Plan

5.8 Session Plan 5.4: main conflict ingredients

OBJECTIVES

At the end of this session the participants will be able to:

- Recognize the different issues in a conflict;
- Recognize that all issues must be addressed for effective conflict management.

MATERIALS

- Flip charts
- Marker Pens
- Handout

PREPARATION

- Draw on a flip chart the 'Conflict Issue Triangle' (See Session Support Material – 1)
- Provide clear instructions to participants on the group exercise.

TIME

- 60 minutes

STEPS

1. **Briefly explain the theory of conflict issues** using the Conflict Issue Triangle. Explain that most conflicts involve several issues. Usually, more than problem has to arise before a dispute breaks out. It is important to differentiate these issues for an effective conflict management process.
2. **Form groups of four to five people** from a similar geographical location (or where the participants have a shared understanding of a particular water conflict) and explain the task of the group work.
   - In your group identify an example of a water conflicts that you have experienced or have an understanding of. Discuss this example and record your main findings on flip chart based around the following questions:
   a) What are the factual, procedural and relationship issues?
   b) How did the conflict start, and how did it spread to include other issues?
   c) How did the issues influence each other?
4. **Give the groups 30 minutes** to complete the task.
5. After 30 minutes, **reconvene the participants.** Ask one person from each small group to present and explain its findings to the other groups.
6. **Conclude the session by asking the participants to identify commonalities and recurring patterns** from looking at all the conflicts presented. What conclusions can be drawn from this comparison? Emphasize the following key learning points.

COMMENTS

- Conflicts cannot be handled effectively if the different issues are not understood. Most conflicts consist of all three types of issue – substance, relationship and process – because the issues are interdependent and often influence or reinforce each other. A conflict about factual issues can lead to strained or spoiled relationships, for example, when critical feedback regarding a decision is seen as a personal attack.
- Many substantive issues are difficult to solve, not because a fair compromise is difficult to find, but because relations among the conflict parties are strained – trust has broken down, feelings are hurt, etc. – or there are no acceptable decision-making processes in place.
- Just as conflicts involve all three types of issue, solutions need to address all three. The inability to find a substantive solution that is perceived as fair by all parties may imply that certain psychological or procedural needs have not yet been satisfied.

- The techniques and procedures for handling factual issues, such as divergent interests, are different from those required for handling relationship issues, such as hurt feelings and mistrust.

The Conflict Issue Triangle

SUBSTANCE ISSUES
Conflicts are about:
- differences in use, distribution or accessibility of resources;
- divergent interests or needs;
- non-conforming data, standards or rules.

Solutions: Tangible, measurable outcomes based on objective indicators.

RELATIONSHIP ISSUES
Conflicts are about:
- status, prestige, power and influence;
- sympathy/antipathy, likes and dislikes;
- distorted perceptions of and negative attitudes towards other conflict parties.

Solutions: Demonstrated interest, empathy, understanding and acknowledgement, which influence perceptions and emotions positively by matching the ways in which people want to be treated and feel about themselves.

PROCESS ISSUES
Conflicts are about the way decisions are made:
- poor stakeholder consultation, which may lead to resentment;
- limited cross-sectoral planning and coordination, which may lead to overlapping and competing goals;
- inadequate or poor information sharing, which may lead to suspicion and mistrust.

Solutions: Preferred processes, fora and participation to think through issues and make decisions.

Session Plan

5.9 Session Plan 5.5: conflict management 'warm up'

OBJECTIVES

At the end of this session the participants will be able to:

- Demonstrate actively how conflict can be managed through cooperation.
- Use as a "warm-up" introducing conflict.

MATERIALS:

- About 20 chairs.

PREPARATION

- Each participant must be given one instruction (see Step 2 below) only. Therefore write or print only one instruction on one individual pieces of paper.
- Make sure that approximately a third of participants receive instruction 1, another third of participants receive instruction 2 and the final third receive instruction 3.
- Clear the room or a large space of all tables, but leave about 20 chairs which should be placed in the centre of the room.
- Choose two points, "x" and "y", which are on opposite corners of the room and mark these prominently.

TIME

- 30 minutes.

STEPS

1. **Do not explain the purpose** but tell participants that it will become apparent at the end of the activity.
2. **Give** each participant an instruction 1, 2 or 3:
   a) **Arrange all the chairs in a circle.**
   b) **Put all the chairs near the point marked "X".**
   c) **Put all the chairs near the point marked "Y".**

   Distribute equal numbers of each instruction randomly among the group. **Tell participants that they should not read the instructions until they have been told to do so.**
3. **Explain** to the participants that they will have five minutes to carry out the instructions given to them. **Tell them that they should not show their slips to anyone else.** (Note: Do not say anything about not talking to anyone else.)
4. Once the above instructions are clear to everyone, **ask them to open their slip**s and carry out the tasks described in them. Carefully watch the process in the different groups, as well as in the overall group, noting especially whether and how they start to cooperate and come to a solution. If they do not come to agreement and reach an impasse, stop the activity and start a discussion with the following questions:
   - What did you experience during this activity? (Answers will probably range around conflicts, confusion, communication breakdown, etc.)
   - How did you interpret the instructions? Did you follow them? Why or why not? (People often interpret the instructions as "competing" rather than "collaborating" – relate this to resource management situations).
   - When did you start to cooperate? (If they did not cooperate at all, ask them how they could have.)
   - Were there any obvious mediators? What was their role?
   - How did the different people relate with one another? Confront one another? (Individuals will often focus on their specific tasks without relating it to what others is doing or how they can work together to complete a task.)

- How is this activity related to a real situation in their experience? Bring out issues of conflict, collaboration, working in isolation, partnerships.
- What does this tell us about conflicts over limited resources? About compromises and trade-offs? (Point out that often a goal that seems impossible to achieve because of conflicting interests can be modified to accommodate different stakeholders so that everyone's interests are at least partially met. This might sometimes be the only way to move forward.)
- What did you learn about collaboration?

Instructions:

1. Arrange all chairs in a circle
2. Put all the chairs near the point marked 'X'
3. Put all the chairs near the point marked 'Y'

Session Plan

5.10 Session Plan 5.6: developing negotiation skills

PURPOSE

- To increase understanding of the negotiation process and the skills it requires.

MATERIALS

- Flip chart
- Coloured pens
- Two copies of the Observer's sheet per person.

PREPARATION

Prepare flip charts from:

- A definition of negotiation
- Enabling negotiations
- Blocking negotiations

Ask two participants to prepare a role play in which they negotiate to an IWRM Plan. They should prepare the role play before the session or trainers prepare in advance depending on level of participants knowledge of negotiation.

TIME

- 2 hours

STEPS

1. **Explain** the purpose of the activity. Ask participants to brainstorm a definition for the word "negotiation". Record all their responses on a flip chart. Post A definition of negotiation and discuss how similar or different it is from the participants' perceptions.
2. **Ask the participants** to list situations in which people use negotiation skills. Encourage them to think of people in a variety of situations and relationships: between buyers and sellers, employers and employees, friends, spouses, parents and children, etc. Record these situations on a flip chart.
3. **Next, explain that two volunteers are going to role play** the negotiation situation that they have prepared in front of the whole group. They are to negotiate and, if possible, end with some agreement(s).
4. **Distribute a copy of the Observer's sheet** to each participant (except the role play volunteers). Ask them to observe the negotiation as it is acted out, and answer the questions on the sheet.
5. **Ask** that the role play begin.
6. When the role play has finished, **ask which behaviours supported the negotiations** by helping them move forward. Post Enabling negotiations and discuss. Ask which actions the observers saw demonstrated. (Emphasize that, in negotiations, people often argue over conflicting positions and rarely find mutually agreeable solutions unless they explore the needs and interests underlying those positions.)
7. **Ask which behaviours blocked the negotiations**. Post Blocking negotiations and discuss.
8. **Ask which actions the observers saw demonstrated.** Discuss their observations.
9. **Distribute a second copy of the Observer's sheet to each person.** Divide the participants into groups of four. Explain that each group should pick one of the negotiation situations that were listed in Step 2 or an actual situation within IWRM with which the participants are familiar. Two people in each group should role play the negotiation while the other two observe using the Observer's sheet as a guide.
10. **At the end of the negotiations, the two observers should give the other two feedbacks** on the negotiation behaviours that they saw and their effects. It there is adequate time, they can switch roles and does a second role play with the other pair as observers.
11. **Explain** that they have 40 minutes to complete the task.
12. **After 40 minutes, reconvene** the overall group. Initiate a discussion around the following questions:

- What are the advantages and disadvantages of negotiation as a means of developing an IWRM plan or managing a conflict over the contents of such a plan?
- What were the most difficult issues in the negotiations? How did participants overcome these difficulties?
- Did any group raise some issues that were not negotiable? If yes, how did they handle these?
- What are some of the more difficult aspects of negotiation in developing IWRM in your country or at the regional level? (For example, participants may refer to methods for organizing multi-stakeholder negotiations, cultural diversity, lack of sufficient information, etc.) Refer these difficulties back to the group for any suggestions on how to address them effectively.
- Are there any particular issues within IWRM that are more difficult to negotiate than others? (For example, participants may refer to policy issues such as water rights and water use/access, or situations in which different value systems clash.) Refer these difficult issues back to the group for any suggestions on how to address them effectively in negotiations.

A DEFINITION OF NEGOTIATION

A negotiation is a focused discussion regarding needs and interests, with the intention of finding a mutually acceptable agreement. It is a voluntary action, in which negotiating parties structure the content of their meetings, determine the outcome of their agreements, and stipulate the methods for assuring the implementation of their final decisions.

Observers Sheet

	Person A	Person B
POSITIONS		
Underlying needs/interests		
Behaviours that attempted to meet the other person's needs, or moved the negotiations towards agreement		
Behaviours that blocked the other person, preventing him or her from getting what he or she needed, or moved negotiations away from agreement		
How the problem was redefined		
How the problem was solved		

ENABLING NEGOTIATIONS

Negotiations are enabled by:

- Separating the people from the problem and focusing on solving the problem;
- Making clear the underlying needs and interests of the parties;
- Identifying and concentrating on responding to the parties' underlying needs or interests, rather than on their stated positions;
- Building agreements by integrating information;
- Generating many options for meeting as many of all parties' needs as possible;
- Being as objective as possible about which options are fair and reasonable;
- Using open and non-judgemental questions and active listening;
- Redefining problems to include all parties' needs.

BLOCKING NEGOTIATIONS

Mutually beneficial negotiations can be blocked by:

- Ignoring the other parties or their needs and interests;
- Changing the subject or delaying discussion of difficult subjects;
- Demands that are unrealistic and far more than what can be met;
- Asking questions to which you know there are no answers;
- Hiding information;
- Measuring success in terms of the other side's losses;
- Making threats, insulting, criticizing, blaming, interrupting, attacking mistakes or anything else that is seen as hostile.

Chapter 6
Management Tools: IWRM Planning

Management instruments are the elements and methods that enable and help decision-makers to make rational and informed choices between alternative actions. These include a wide range of methods, both quantitative and qualitative, based on disciplines such as hydrology, hydraulics, environmental sciences, system engineering, legal sciences, sociology and economics (GWP IWRM Toolbox).

This chapter deals with the management tool: IWRM planning.

Integrated river basin planning is a stepped process and is widely advocated and practised. It forms the basic planning procedure in this Manual.

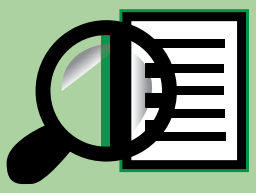
This following material draws heavily from the Handbook of IWRM in Basins (see references) and illustrates a wide variety of experiences. This material has been selected to be included in this Manual as the procedures and examples echo the Mekong River Commission and the levels of economic development of member countries. Care should be taken in not directly transferring this approach as it will have to be modified to suit Sub-basin Planning. This is discussed later in this chapter and includes the Mekong procedures for BDP2 sub-area activities of localised sub-basin planning.

6.1 The difference between a 'strategy' and a 'plan'

>>> **A strategy is a plan of action designed to achieve a particular goal.**

>>> **A plan is a series of steps to be carried out or goals to be accomplished.**

While definitions vary, they are often used to mean the same thing. In this manual, a strategy is seen as preceding a plan – the plan being a document which sets out actions. However, there is no hard and fast rule on this.



Emergence of the Mekong River Commission (MRC) Basin Development Strategy

The Story of Mekong cooperation begins in the middle of the 20th century with the formal signing of the Geneva Accords, when the newly independent nations of Cambodia, Lao PDR and Viet Nam took their places on the world stage. **The Mekong Committee opened office in 1959 in Bangkok**. When the Mekong Committee began its work, there were no models to follow. Since its early days, the Committee was guided and supported by ECAFE/ESCAP and the UNDP. **The emphasis of the cooperation was on surveys and studies for large-scale projects.** In one form or another, the Committee continued its operations during times of regional instability.

The "1995 Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin" was a coming-of-age for the Mekong Committee, now the Mekong River Commission (MRC). No longer under the umbrella of ECAFE/ESCAP and the UNDP, its Articles give full management responsibility of the MRC to a Council of Ministers of member countries. **The Articles of the 1995 Agreement have retained much of the original 'Mekong Spirit', but have shifted the focus from development of large-scale projects to sustainable development and management of natural resources.**

Through the 1995 Agreement, MRC, as an intergovernmental body, acts as a focal point for the cooperation, and assists the member countries in achieving their basin scale aims

through provision of shared information, technical guidance, and mediation. The Agreement establishes a forward-looking framework and mechanisms for pursuing the concept of IWRM at the basin scale and provides a platform upon which to build suitable stakeholder participation processes that cover all aspects of basin wide water management. The upper riparians, China and Myanmar became dialogue partners in MRC sessions.

Since 1995, the Mekong River Commission has made slow but sure progress, with member country agreement to a procedural framework for cooperation and the development of regionally recognized knowledge base. It also established a participatory process for basin planning. Most of MRC's activities are now implemented through sector or thematic programmes. The annual budget of the MRC is in the order of USD 10 million. About 10% of the budget is paid by the member countries and 90% by donors.

In 2009 a start has been made with the definition of core functions, which would be fully financed by the member countries after a transition period of 5 to 10 years.

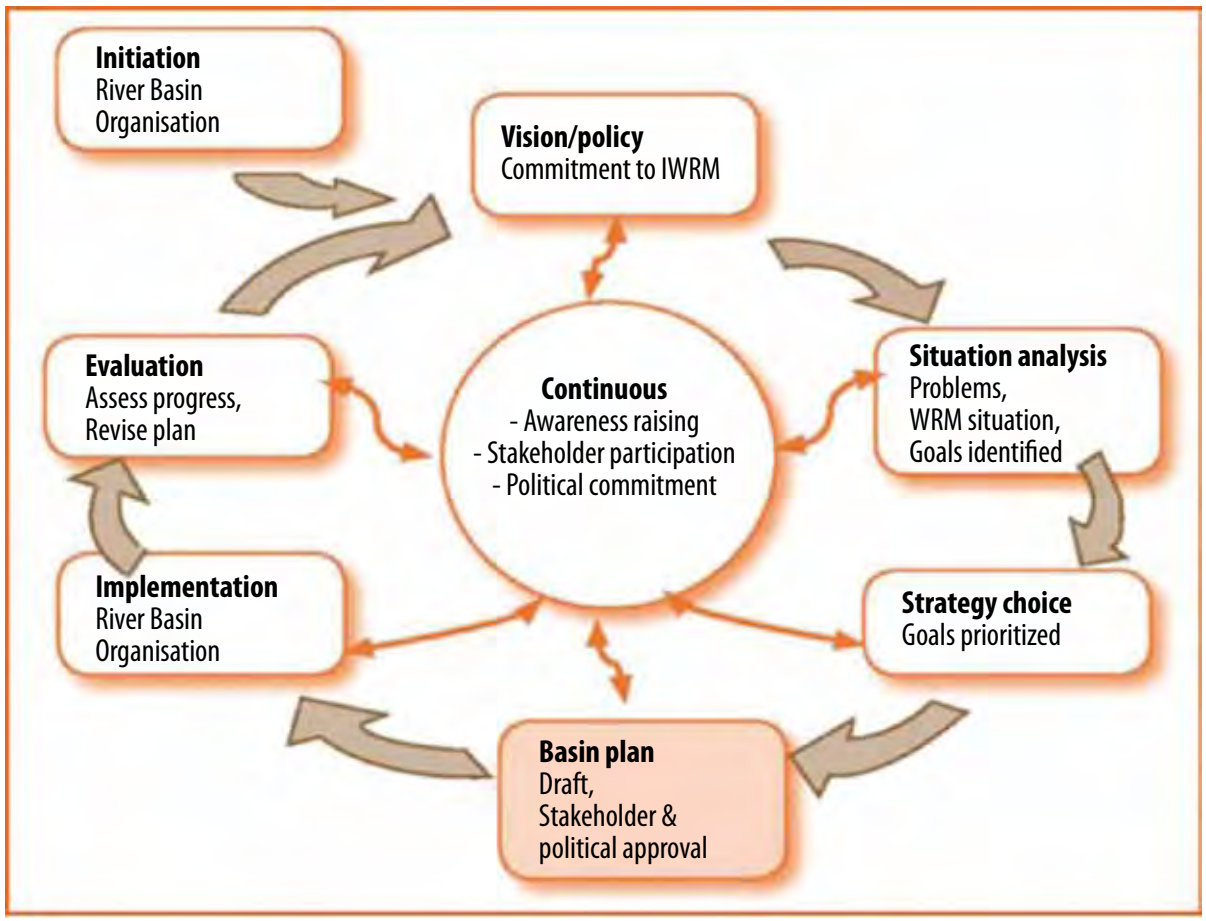
The MRC does not have a mandate to "direct" countries to follow various IWRM procedures and processes, and nor should it, as the basin cooperation model is built on "cooperation, coordination and mutual respect". However, the four countries have recognized the need, and value, of improving the links between basin level and national level planning of water and related resources, and making them much more explicit. They are doing this through the second phase of the Basin Development Plan Programme, which is focusing on developing a common understanding of the IWRM transboundary issues and problems, and of the importance of the environmental and social values and assets of the basin, and how these can be used and managed. This will all be brought together in an **IWRM-based Basin Development Strategy.**

6.2 General procedures for planning

The general procedure for integrated river basin and sub-basin planning using an IWRM approach is based on that in Figure 6.1. Note that there are few basin organisations that act as regulators, rather they act as advisors to national governments (like the MRC). So, this cycle is one basin organisations must engage in with national governments who plan water resources management and development.

The 'learning-by-doing management cycle' helps us incorporate what we learn in the process of planning and managing water and take into account new information as it comes to hand. This means we can adapt how we manage water to changing circumstances, for example political changes, natural catastrophes and changes in demography.

Figure 6.1 The learning by doing management cycle of planning and implementation



Source: CAP-NET/UNDP, 2008: INTEGRATED WATER RESOURCES MANAGEMENT FOR RIVER BASIN ORGANISATIONS. TRAINING MANUAL, p.86

>>> **SEE SESSION PLAN 6.1: THE IWRM PLANNING CYCLE**

6.3 Basin management strategies

A **Basin Management Strategy** in this cycle sets out the long-term goals and aspirations of basin managers – the 'shared vision' - for water resources management, and how these goals are to be realised. A strategy usually covers a ten to twenty-year period. The strategy determines the overall directions for basin management and is the basis for developing detailed three - to six-year **basin management plans** or **action plans** (see later in this chapter).

The strategy takes into account national – or regional in the case of transboundary basins: water management policies;

- Context, type, scale and severity of water and land resources management problems;
- The general and water-related development goals;
- The level of economic development of the basin;
- The capacity of water managers and institutions to manage natural resource problems; and
- The financial resources available during the strategic period.

Although strategies are a management tool, they are best developed with the involvement of the full range of stakeholders (see Chapter 5 Public Participation).

There are five main elements in developing a Basin Management Strategy. These may or may not be taken in sequence depending on circumstances:

1. Identifying the issues;
2. Setting priorities;
3. Identifying management options;
4. Analysing costs and benefits; and
5. Assessing risks.

These are discussed below in detail.

The outcome of the strategic planning process should be a clear statement of the 'shared vision' of a basin organisation or basin initiative setting out unambiguous goals and explaining how, when and where the goals will be achieved (see case study: Niger Basin Authority: A Shared Vision). The strategy document should preferably take the form of a formally approved official management plan indicating how the initiatives of all stakeholders involved (public and private) will be co-ordinated and specifying the rules and regulations that will be implemented in the basin. The statement should be made easily accessible to all stakeholders in a format that can be understood by all.

Focus Point

Guidelines for building a successful basin management strategy

- Have a clear view of the actual situation of water resources in the basin.
- Agree on goals and targets.
- Propose scenarios to be discussed with stakeholders.
- Co-ordinate priorities and actions of all stakeholders.
- Lay down a framework for making decisions.
- Link the basin strategy to broader development goals, and national and regional development planning processes.
- Anticipate the need to strengthen capacity and fund capacity building.
- Involve and gain the support of stakeholders, including women and the poor.
- Allocate human and financial resources to the strategic planning process.
- Set a timetable with milestones and targets.
- Make sure the strategy includes funding requirements and funding sources.
- Put in place monitoring and evaluation systems that feed back into the planning process.

Source: GWP TEC 2004

Niger Basin Authority: a Shared Vision

In 2003, the nine member states of the Niger Basin Authority (NBA), Benin, Burkina Faso, Cameroon, Chad, Ivory Coast, Guinea, Mali, Niger and Nigeria, formulated a "clear and shared Vision" for the Niger Basin. The vision is to create an enabling environment for co-operation based on a Sustainable Development Action Plan (SDAP).

The Declaration of Paris on the "principles of management and good governance for sustainable and shared development of the Niger Basin" was signed in April 2004 by the nine Heads of State and Government.

The EU Water Facility provided funds to NBA to:

- Draft a Water Charter
- Make the Sustainable Development Action Plan consistent with national and regional Integrated water resources management processes
- Prepare investment programmes and methods for implementing projects.

With the formulation of the SDAP, the development of the investment programme at the end of 2007 and the Summit of the Heads of State and Government and Roundtable of Donors held in 2008, the NBA will be able to achieve practical and lasting outcomes for ensuring the future of Niger Basin users and citizens.

More on the NBA at: www.abn.ne

1. Identifying issues

The first step in developing a strategic plan is to get a clear idea of the water and land resource management issues in a basin. The pressing need is frequently, as it is in the Mekong, to identify priority IWRM issues in most of the LMB countries (e.g. issues that are being or will be addressed in the next few years).

One useful method for identifying issues is scoping, but other methods, such as initial impact assessment, can also be used. The objective is to gain an overview of the issues, how critical they are, who they affect and the chances of being able to achieve results in the short term.

Scoping is a way of making sure all aspects of an issue are considered. Basin managers can do this in many ways, through stakeholder workshops, surveys, or by asking for reports from different groups, for example. Putting the results of the scoping exercise together will define the scale and extent of the problem, the range of issues to be addressed, the environmental policies and regulations that affect the issue and will probably indicate possible management solutions. Defining problems in this way helps basin managers and stakeholders map out the boundaries of the problem in terms of what is within the power of basin management to change and what is outside their authority. When done upfront, scoping is useful both for making strategic long-term plans and for developing short-term action plans.

The **matrix method** is another way of assessing and prioritizing the importance, scope and the context of water management issues with respect to the overall basin. Derived from the screening and ranking methods used in rapid impact assessments for environmental assessments, it helps in ranking different issues against each other (Box 7.B).

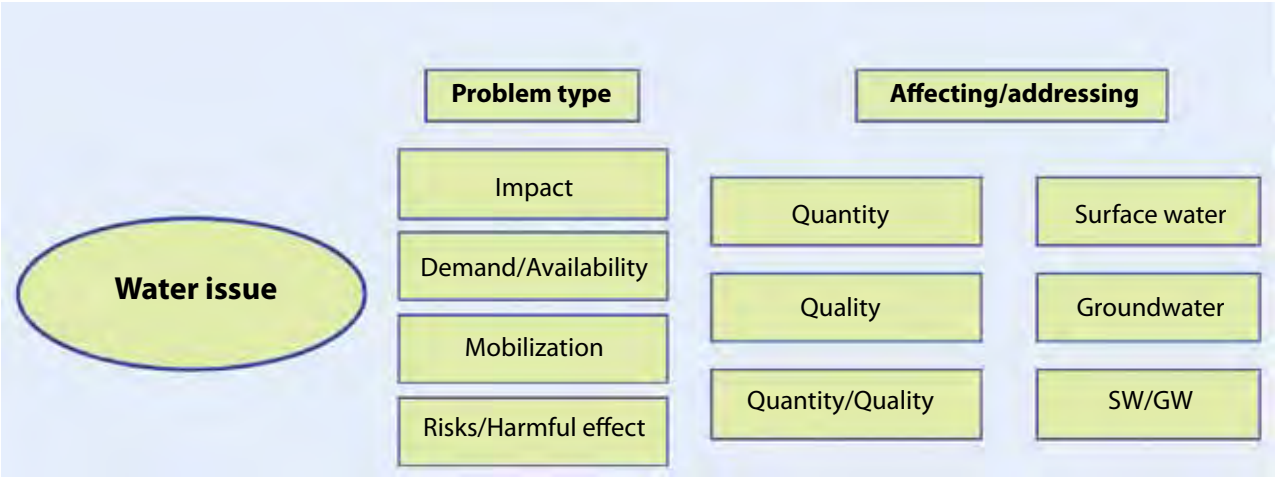
Focus Point

Setting priorities, evaluating and ranking water resources issues

Setting priorities

- Specify and prioritise natural resources management issues clearly and within national planning and development goals.
- Specify how each issue will be addressed in the planning process.
- Check each priority issue against the constraints and opportunities of the basin's hydrology.
- Relate priorities to financial resources.
- Do what is most pressing first!

Matrix for evaluating and ranking water resources issues



SW: surface water; GW: ground water
Source: http://www.scaucasuswater.org/files/introduction_to_water_resources_issues_assessment_model.pdf

2. Setting priorities

Once the issues have been identified the next step is to set priorities. Often it is better to tackle the more feasible development and resource management problems first, rather than to attempt to resolve more complex problems or address all problems simultaneously. Models and decision-support tools can be helpful in setting priorities.
Importantly, local priorities must be integrated with regional and national priorities for water management, linking them to overall integrated water resource management strategies and plans.

These priorities will also reflect the financial resources available to address the issues, picking the 'low hanging fruits' first. In this way a basin organisation can achieve substantial gains quickly and achieve more credibility with the basin's stakeholders.

3. Prioritising using models and other decision-support tools

Models can be used to assist decision-making by evaluation options and selecting the preferred option for water resources management. Advances in computer technology, particularly geographic information systems (GIS) and decision-support systems (DSS), have revolutionised decision making in river basin management in many countries.

Models draw on data sets in basin information management systems (see Chapter 9 Basin information systems and monitoring). GIS integrate and analyse data sets, for example ecological and environmental data, and present the results spatially. DSS look at different scenarios and show what happens when parameters are changed. These tools can be used by groups or individuals in offices, workshops or, when they can be accessed on the internet, even in the home. Another advantage of these tools is that they promote transparency.

Geographic information systems are widely used in developed countries to organise geographically-referenced data about the basin - electronic atlases in other words. Most systems allow users to search, for example, by land type, land use, management options, settlement patterns, land ownership or planning zones. Many are user-friendly, available on the Internet and include different kinds of visualization technologies that display the results of decision-support models.

Decision-support tools are useful in predicting the outcomes of alternative plans and programmes. They are usually, but not necessarily, computerised systems. They assist in day-to-day operational and long-range strategic decision making. Where more complex decision models are required, expert systems can play an important role in predicting outcomes. Expert systems are commonly used for on-going management problems. But, they can also be used to develop policies and management plans for irrigation districts with rising water tables, strategies for tree planting and land-use options for highland river basins, for example.

Modelling tools are useful for integrating social, economic and biophysical data, usually in a geographic information system, and displaying management options. Groups of users - basin managers, farmers, agri-business managers, water user associations, government agency policy makers, government planners - can interrogate models to see what the impacts of different water management practices would be. Users can often just point-and-click on a map.

Models can illustrate important concepts, for example that lakes take a long time to recover from pollution or degradation and that prevention is much more effective than trying to restore them. Models are also useful for indicating solutions. For example, models of water quality management options might show that water quality is more important in some parts of a basin than in others.

Based on these models, basin managers might decide that, where water quality is important, people might be more willing to pay for water quality management or change the way they manage water than where water quality is not so important.

Optimisation and simulation models are other ways of examining certain problems. Optimisation simplifies problems, for example, by aggregating spatial descriptions of a particular problem. Simulation models can then be used to generate, for example, dynamic scenarios (see following Focus Point).

Mekong River Commission: models and decision-support tools

A Decision-Support Framework has been developed by the Mekong River Commission (MRC) as an analytical tool for assessing the magnitude of changes and impacts caused by natural and man-made interventions. This tool helps to build trust among member countries by showing the behaviour of the river system under a range of interventions. The model can be used for a number of years (hydrological data is available since 1985 in the Lower Mekong Basin) or a single year or season. Simulations enable planners to look at what might happen to a range of socio-economic and environmental indicators.

The choice of socio-economic issues that are assessed will depend on how the planners structure their analyses. This in turn depends on the data that is available. Environmental indicators have been identified in relation to the transboundary issues identified by the four basin member states.

More information on the MRC at: http://www.mrcmekong.org

4. Identifying management options

Once priorities for basin management have been agreed, the next step is to determine what management action is necessary to address these priorities. In this step, identifying and targeting action needs to take place at several levels:

- At the *local level*, for specific farms, properties or neighbourhoods, municipalities and industries, such as site management plans
- At the *sub-basin level*, where there are cross-cutting issues which require a broader scale of management, such as storm water management plans, pollution control.
- At the *whole basin level*, where government and other institutions need to take action, on for example cost-sharing, tax incentives, laws to abate pollution, poverty reduction, building the capacity of water user groups.

At the local level, the best management options will be targeted at farmers, producer organisations, local government planners, provincial government resource managers, extractive industries and manufacturing industries, nature conservation managers and recreation managers. The options need to complement sub-basin management plans and the overall basin management plan. Some kind of co-ordination mechanism, such as national planning legislation, is needed to link bottom-up and top-down action.

The strategy **should show how basin action plans will be financed**. Weighing up costs and benefits is a critical part of developing the basin strategy and deciding on the best options. This means identifying who will benefit and who will be disadvantaged.

Once water management options have been identified, the next steps are:

- To select the most **cost-efficient set of options** regarding selected priorities (i.e. the set of actions that will address the priorities (objectives) at the lowest cost;
- To assess the costs and benefits of the selected set of options (and how these costs will be divided between different sectors).

Focus Point

Guidelines for sharing costs and benefits

- Quantify the benefits and costs of water management.
- Address equity.
- Link the size of water allocations to the benefits derived.
- Work out multiple benefits step-by-step before making agreements on water sharing and who pays.
- Define benefit shares initially at a sub-basin level then aggregate them up to the whole basin (including across international borders).
- Use a third party to promote sharing arrangements, such as funding agencies (World Bank) or environmental organisations.
- Recognise the link between water policies and transboundary water issues.

To do this **economic analysis tools**, such as cost-effectiveness analysis and cost-benefit analysis, can be used.

To achieve the objectives set as priorities there may be several alternatives (options). Cost-**effectiveness analysis** examines the costs (i.e. investment, operating costs) and benefits of each alternative. This gives basin managers a ranking of the alternative options according to the ratio of cost-effectiveness. **Benefit sharing** focuses attention on the value derived from water use and ecosystems, and takes into account water quality and risks, rather than focusing on the more contentious and less useful process of trying to allocate specific amounts of water to different parties.

Benefit sharing in the Senegal Basin is an example of how the costs and benefits of major water infrastructure projects can be shared (Box 8F). The concept of value derived from water use is applicable in a wide range of economic, social, political and environmental uses, between recreation or biodiversity and commercial fishing for example.

Organisation for the Development of the Senegal River: benefit sharing

The Organisation for the Development of the Senegal River (OMVS) has had strong political support for more than thirty years at the highest level (the supreme governing body of the organisation is the Conference of Heads of State and Government). This political support is based on a benefit sharing system between riparian states and the implementation of concrete activities in favour of regional development.

Two major hydraulic infrastructure projects (the Manantali dam in Mali and the Diama dam on the Senegal-Mauritania border) and an energy distribution network will stimulate regional development.

In the early 1980s the OMVS received loans and grants from various funding agencies to finance this major infrastructure programme. The contribution it would make to irrigation, energy production and navigation was calculated as well as the overall benefits to each member country.

Benefit	Mali	Mauritania	Senegal
Irrigation	11%	31%	58%
Energy production	52%	15%	33%
Navigation	82%	12%	6%
Overall	35%	23%	42%

The debt repayment is shared pro rata among the three countries according to the benefits that will accrue to each.
More information on the OMVS at: http://www.omvs.org

5. Assessing risks

One of the key issues in developing long-term basin management strategic plans is to assess risks, such as those posed by floods, droughts, or other natural disasters, and to devise measures to alleviate these risks. For example, it is becoming increasingly important to plan for the risks posed by changes in climate.

Because more and more data is becoming available and models of climate change are constantly being updated, basin organisations need to make sure that their strategic plans are not set in stone, but can take this new information on board and 'auto-adapt'. Planning systems need to be set up so that new data and information can be fed in immediately it becomes available. In this way, basin management strategies can be rapidly adapted to new predictions. There are usually no simple technical fixes for some of the scenarios and basin managers will usually need to mix hard and soft strategies in their plans to minimise these risks.

Focus Point

Strategies to minimise risk

Hard strategies - infrastructure and technology:

- Traditional water storage systems;
- Flood proofing;
- Storage management;
- Early warning systems;
- Integrated water systems and supply security;
- Water reuse and desalinisation.

Soft strategies – institutions, technologies and management systems:

- Demand management;
- Efficient technologies;
- Establishing a culture of conservation;
- Managing water scarcity through trade;
- Land use planning;
- Education and communications.

6.4 Basin management plans

Contents

Sometimes called basin action plans, the basin management plan sets out the goals, objectives and programmes for managing water for a specific period, usually between three and six years. This plan is brokered by decision makers in the basin - government agencies, local authorities, municipalities, private firms, farmers, individuals and community organisations - and 'signed off' by the basin organisation. The agreed plan will specify responsibilities for action, how costs will be shared, lines of accountability and channels for exchanging and distributing information.

A Basin Management Plan is the basin organisation's blueprint for water management across the basin (see focus points below).

Focus Point

Design principles and main components of a basin management plan

Basin plans - design principles

- Define the boundaries of the basin (river basins or sub-basins, aquifers, lake basins; national or transboundary).
- Establish operational rules which reflect the technical and biophysical characteristics of water ecosystems.
- Ensure collective-choice arrangements that engage village and district stakeholders as well as neutral government water policy people in decision making.
- Monitor the outcomes of planning and policies through water audits.
- Employ graduated sanctions.
- Build in conflict resolution mechanisms.
- Develop clearly defined property rights.
- Separate the role of water provider from that of the regulator, to avoid conflicts.
- Develop both demand management and supply management options, and encourage water-use efficiency through non-regulatory and regulatory mechanisms, particularly to increase efficiency in irrigated and dryland areas.

CONTINUES OVERLEAF

Focus Point

Basin plans - main components

- The GWP IWRM Toolbox recommends that river basin plans should include information on the following items:
- Physical description of the basin
- Land use inventories
- Current water availability and demands
- Pollution source inventories
- Aquatic and terrestrial ecosystem needs
- Vulnerability to floods or extreme meteorological events
- Identification of stakeholders and mechanisms for participation
- Implications of changing land use
- Identification of priority issues (impact issues or user requirement issues)
- Short- and long-term goals for the river basin
- Water related development scenarios, future water demands + risk assessments
- Water allocation and water quality objectives
- Strategy, measures and action plans for the achievement of goals, including sub-basin management plans
- Financing of water use and management
- Responsibility and schedules for implementation
- Mechanisms for monitoring and updating
- Annexes including specific studies such as areas of significant environmental problems

It is important to understand that the basin organisation itself will not undertake all the tasks in the plan. The role of the basin organisation is to co-ordinate the various tasks that will be carried out by others. For example, a plan to reduce pollution in a basin might require a combination of actions by local councils, waste disposal industries, farmers, local government planners, government resource managers, extractive and manufacturing industries, nature conservation managers and recreation managers. In this case, the task of the basin organisation would be to co-ordinate action and get agreement on who will be responsible for doing what, and where and when they will do it.

The basin management plan should be developed in such a way that it cannot be put on the shelf and ignored. To ensure this doesn't happen a reporting and accounting system should be built into the plan. For example, national and transboundary basin management plans should stipulate what should be reported to national governments and how often these reports will be made. The basin organisation should also be subject to auditing by an independent authority. The audit should examine the outcomes of the basin management plan and, if warranted, recommend changes to improve outcomes in the future.

A practical way of making basin management plans dynamic documents is to bind them in loose-leaf folders. This way they can be updated as new information emerges (audits, new scientific discoveries, stakeholder inputs) and respond to changing circumstances. A basin management plan must be a **living document which managers use, update and adapt as they put the plan into practice.** For the plan to be successful, stakeholders and the general public must become involved. Lessons learned as projects and programmes get underway must be fed back into the plan so that successes can be repeated and mistakes avoided.

Coordinating action

To implement the basin plan, a basin organisation must co-ordinate the actions of many parties with different roles and responsibilities. Take irrigation for example: for

irrigation water to get to the farmer, the actions of the reservoir manager, the water distribution manager, the farmers themselves and perhaps the environmental regulator, if there is one, need to be co-ordinated. But the responsibilities for these actions often lie with different government departments or, especially in developing countries, even outside government jurisdiction. Frequently, the links in the 'action' chain may not communicate with each other. In large basins, some links in the chain may not even be aware of the existence of the others, let alone co-ordinate with them.

What happens then is that agencies develop discrete local solutions that do not take into account impacts and improvements across the basin. To avoid this fragmentation, basin managers need to build co-ordination into the basin plan. They also need to ensure that the people assigned to carry out tasks have the capacity to work in teams, and plan across sectors and disciplines. This may mean working to strengthen skills and capabilities.

Focus Point

Guidelines for co-ordinating basin management

- Encourage a 'learn by doing' approach and create ways of learning from past experiences.
- Establish 'rules' for co-ordination (who is involved), whether it is binding or permissive (what can be done) and the basis for involvement (law, policy, informal agreement).
- Establish integrated action across all natural resource issues in the basin.
- Ensure basin-wide planning procedures balance all user needs, enhance water quality, provide protection from water related hazards, ensure agreement on commitments within the basin, and monitor agreements.

Case Study

Río Jubones, Ecuador: a co-ordination agency in the Jubones basin

The Mancomunidad de la Cuenca del Río Jubones is a co-ordination agency, created by local governments, provinces and municipalities, to manage the water resources of the Jubones basin. The agency aims to evolve and take on more activities. These include identifying common development strategies for the basin with an emphasis on integrated water resources management and aligning provincial and municipal development plans with basin plans. The agency encourages community management of natural resources, emphasising the protection of water sources and food security.

A key task of the basin agency is to educate and train municipal staff and members of Sub-basin Committees in development and water basin management. The agency will also introduce environmental education in schools, again with the emphasis on an integrated approach.

The measures to boosting information and knowledge will strengthen the capacity of municipal staff in municipalities that are members of the Mancomunidad to make decisions about environmental protection and develop appropriate measures.

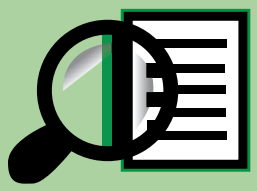
More information on the Jubones basin agency at: http://www.cuencadeljubones.gov.ec

Many basin managers struggle to find the best way to co-ordinate the actions of government agencies and other stakeholders. Basin managers need to select those that they believe will get political and administrative support and can be readily used. The best way is to try what appears to be a good option and evaluate its effectiveness through trial and error.

Coordination tools for basin organisations

Tools for joint planning and management	*Tools for resolving conflict*	*Tools for communicating*
Joint forecasting or scenarios. Joint models or jointly used geographic information systems. Co-location of personnel or creation of common jurisdictional boundaries. Joint review of plans or environmental impact statements. Formal review of clearance procedures. Supervisory oversight. Joint budgeting process. Co-ordination committees. Joint staffing or joint staff work groups. Joint reviews of permits or common standards for review. Joint planning process (including environmental impact assessments). Cost-sharing arrangements for financing basin management works. Joint plans of action (projects, programmes, policies).	Additional research or analysis. Interpersonal or inter-group communication. Appeal to higher authority, outside party, third party (facilitation, mediation). Special meetings of committees or other groups. Negotiation/bargaining within the group. Community advisory committees. Transboundary water agreements. Village meetings and tribal customary law.	Information and data sharing procedures. Common database or data gathering. Regular communication (newsletters, e-mail). Scheduled meetings. Intranet for joint development of plans, papers. Informal communication, social occasions, word of mouth networks.

Source: Hooper, 2005, p.52, adapted from Margerum and Born, 2000, and Margerum and Whithall, 2004.



Case Study

Basin Development Plan for the Lower Mekong Basin

Description

The main aim of the second phase of the Basin Development Plan Programme (2007-2010) is to prepare an IWRM-based Basin Development Plan in support of sustainable development in the Mekong Basin, as envisioned in the 1995 Mekong Agreement, and building upon the participatory planning process established during BDP phase 1. The preparation of the Plan will be based on the concept of IWRM, as this concept holds the promise of reconciling the goals of economic efficiency, social equity and environmental sustainability in partnership with the basin's stakeholders. The plan comprises:

- **Basin-wide Development Scenarios**, which provide the information that Governments and other stakeholders need to develop a common understanding of the most acceptable balance between resource development and resource protection in the various parts of the LMB, and mutual benefits to all riparian countries. The results will guide the formulation of the IWRM-based Basin Development Strategy.
- **An IWRM-based Basin Development Strategy**, which will be a clear statement how the LMB how the countries intend to share, use, manage and protect the basin's water and related resources in an equitable and sustainable way. It will also provide a coherent IWRM planning framework that brings basin perspectives into the national planning process. The Strategy will guide the formulation of the Project Portfolio.
- **A Project Portfolio** of significant water resources development projects and programmes that can enhance the value of the Basin's water and related resources and/or capture the benefits of transboundary cooperation, as envisioned in the 1995 Mekong Agreement.

Lessons learned

1. A stakeholder analysis and participation plan is proving to be a useful tool to engage key stakeholders in a relevant and efficient way.
2. A considerable effort is needed in the beginning of the planning process to build consensus among the key stakeholders on what exactly an IWRM-based Basin Development Plan is and how the Plan should help the countries to achieve their development objectives in a sustainable and cooperative manner.
3. In most countries, technical capacity needs to be build to support discussion and consensus building on the results of the scenario assessment, the possible trade-offs, the selection of the preferred scenario, and the definition of the development space and associated implementation guidance, and to discuss consolidated national positions at the regional level.
4. Proper recording of the discussions and results of workshops and meetings are a prerequisite for the final adoption of the IWRM-based Basin Development Plan and its implementation by the stakeholders in the LMB countries.

6.5 Sub-basin plans

Scale

River basin planning operates at broadly three levels

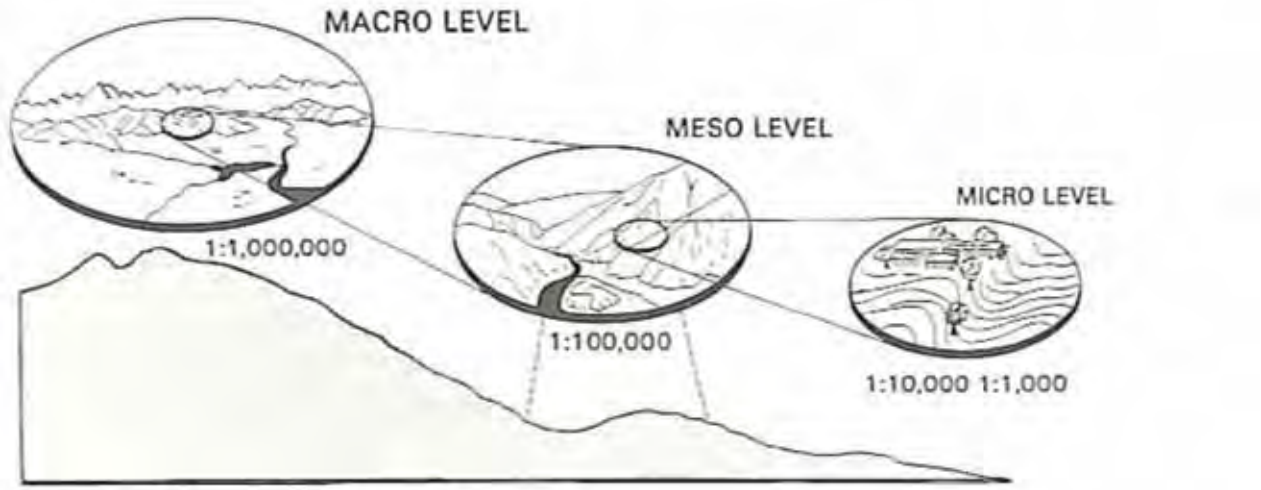


Figure 8.2. Macro-, meso- and micro-level natural water resource systems in a basin management framework
A macro-level system deals with part of a geographical zone, such as a river, lake or aquifer basin. A meso-level system deals with a regional or local ecological system of a lake, river valley within a basin, or sub-aquifer within an aquifer province. A micro-level system deals with a relatively uniform ecological and hydrological unit.

Basin Management Framework

	MACRO LEVEL: Policy/National/International	***MESO LEVEL: Implementation at national and sub-national/sub-basin scales***	***MESO/MICRO LEVEL: Operational***
Type of basin organisation	Transboundary (e.g.) commission	National, inter-state basin (e.g. commission, authority, association)	Local (e.g. land and water management group)
Basin management strategies and plans	Transboundary basin management agreement or plan; transboundary compact; national basin management plan	Sub-basin management plan or strategy, large sub-watershed or sub-aquifer or lake management plan	Local land and water management plan, storm water management plan, local planning scheme (administered by local government)
Level of decision-making	Highest political decision-making level, transboundary agreements	Province, state, district, territory (or national in small states)	Village co-operative, farm, factory, forest, local government, water use district
Natural resource system(see Figure 8.2)	Part of a geographical zone, such as a river, lake or aquifer basin	Regional or local ecological system of a lake, river valley within a basin, or sub-aquifer within a aquifer province	Areas with relatively uniform ecological and hydrological conditions
Source: Hooper, 2005, p.120 adapted from Newson, 1992			

Contents

A sub-basin or land and water management plan is a tool to enact integrated river basin management and local levels. It includes priorities, actions and reporting mechanisms for implementing the overarching river basin management plan at the lower level of the a river valley or smaller catchment within a river basins. Here planning and management is at scales of approximately 1:100,000, but this varies. It includes sections or chapters on:

1. **Context** (a review of the historical, economic, environmental and statutory context within which the Plan will work) and Scale (the size and level of application of the Plan state-wide and in districts)
2. **Engagement processes** - Methods used to engage and use stakeholders to build the Plan; and external auditing of engagement process.
3. **Water services:** Statements of present and future needs and issues; statements of present and calculations of future requirements for water services in terms of water demand and supply, for urban, rural towns, industrial, power generation and irrigation users; determinations of supply reliability in stochastic climatic and commodity environments
4. **Other water services** - floodplain management, salinity management, groundwater management, river management, water quality management and other key issues where appropriate.
5. **Determinations of management options and specific courses of action** - development options, demand management options structural, legal and economic (e.g. user pays solutions); implementation tasks, who is responsible, funding sources; coordination options with other government departments.
6. **Institutional arrangements:** Structure, Governance and Functioning of basin organisations - Purpose and scope, organisational arrangements, composition and representation, decision-making rules, funding and staffing, authority of each government department
7. **A monitoring programme** to measure successes and failures of plan and provide accountability of government investment; congruence and linkages with state-wide state of the environment reports and/or environmental auditing and monitoring.

Case Study

Case Study on Watershed Plan of Action - Siem Reap Watershed, Cambodia

The watershed "Plan of Action" is a basic tool for Integrated Watershed Management. It prioritizes critical issues that do or might impact watershed functions – such as water quantity and water quality beyond acceptable levels – and identifies actions to improve the state of the watershed. It is based on a collection and/or update of ecological and socio-economic data, water related issues of development plans, and social and community surveys and identifies potential causes for watershed degradation, such as river bank and soil erosion, pollution, groundwater issues, riverine vegetation, deforestation etc. Specific targets and indicators relating to the main watershed functions are set to follow up on achievements over time. The "Plan of Action" must continually be monitored, updated and revised as more information becomes available about the watershed's natural resources and about the people living in the watershed, their changing needs, and potential new threats.

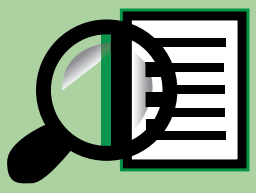
The elaboration, implementation and monitoring of the plan of action is a multi-stakeholder process managed by a Watershed Management Committee. The committee is an institutionalised platform with a clear mandate, operating rules, procedures and budget. Members are relevant governmental and non-governmental actors in the watershed who are trained or being trained on watershed management principles.

A watershed management "Plan of Action" is never the same for the many watersheds that exist in a river basin. Each individual watershed might have a different mix of environmental issues, social considerations and economic factors. The "Plan of Action" for the Siem Reap watershed has identified ten critical issues. The most important are loss of forest cover, destructive sand dredging on the river banks and waste and poison management. Four issues that correspond to the typical mandate of line ministries such as Forestry, Agriculture, Environment and Water resources, the watershed committee ensures that they are being taken up in the socio economic development plans at commune and provincial level.

Cross sectoral issues with uncertain institutional mandates and legal frame work, require the Water Shed committee's special attention. Task forces might have to undertake further investigative work. This is the case with the sand dredging issue. On site studies are being carried out and a dialogue with the private sector is initiated to find realistic and environmentally sound solutions. Policy recommendations are being developed to ensure their sustainability.

Lessons learned

- Coordination and facilitation among provincial line agencies, the private sector and civil society is essential for effective integrated watershed management. It needs commitment and participation from all relevant bodies involved. Full support by local authorities helps to overcome different views and interests.
- Resource mobilization for cross sectoral issues under the existing administrative set up is a major bottleneck for a sound watershed management.
- Only issues which have a visibly devastating impact on the watershed will motivate a coordinated response of the watershed committee and local authorities.
- Capacity development is a key to creating the necessary institutional framework, technical knowhow and ownership to effectively apply Watershed management practices.



Case Study

Nam Ngum River Basin IWRM Plan

The Nam Ngum River Basin, Lao PDR

The Nam Ngum River Basin is the 2nd largest river basin in Lao PDR, both in terms of annual flow and population, and the 5th largest in terms of area (7% of Lao PDR). The Nam Ngum's annual flow is 21 billion m3 which is 14.4% of the flow of the Mekong River. This plentiful water resource underpins an unusually large number of actively growing water using and impacting sectors including rural and urban water supply, hydropower, irrigation, fisheries, forestry, rainfed agriculture, mining, tourism and recreation, environment, waterways, navigation, community uses (e.g. river side gardens, fishing), and flood management.

Because of the rapid development of hydropower and possible competing needs and uses for water, a pilot study of IWRM river basin planning and management was undertaken in Nam Ngum River Basin by the Lao PDR government supported by the Asian Development Bank and Agence Française de Développement.

Developing the Nam Ngum River Basin IWRM plan

The Nam Ngum River Basin IWRM Plan focussed on sustainable water resource use and cross sectoral matters as they relate to water sharing (quantity, quality and flow) The plan included a balance of policy (e.g. water permits, operating agreements) and infrastructure measures, and prioritised actions for development and resource protection. Developing the river basin plan included:

1. Plan management and coordination

Coordination of Plan development was initially the responsibility of the National Water Resources Coordinating Committee (WRCC) of the Prime Minster's Department and the WRCC's Secretariat. Part way through plan development, a Department of Water Resources was formed as part of a new Water Resources and Environment Administration which became responsible for Plan coordination and technical support.

A Planning Team with members from national level agencies with water and related resources management responsibilities as well as Provincial level representatives were directly involved in preparing the plan including the oversight of plan preparation and of the various studies undertaken, the collection of data and information, and advice on plan content and recommendations. They were supported by local and international consultants.

At the time of plan preparation there was no river basin organisation and so a river basin consultation group involving National and Provincial leaders was formed to discuss progress and comment on the plan.

2. The river basin profile

The River basin Profile was a key step in setting the boundaries and priorities for the Plan. It was prepared in consultation with a wide range of, mostly government, stakeholders and reviewed (i) water resource, environmental and socio-economic conditions and trends, (ii) existing water and land uses, (iii) relevant government plans and policies, (iv) sectoral development plans (v) stakeholders, their responsibilities and issues in relation to management of the river basin, (vi) current and emerging issues of importance in the basin, and, (vii) stated an initial objective for the river basin plan.

A GIS of the river basin was built from data obtained from various agencies and the MRCS and underpinned the development of the plan. Coincidently, the River Basin Profile and GIS were also used extensively by the Cumulative Impact Assessment for Nam Ngum 3 Hydropower Scheme which was undertaken by the ADB.

3. Scenario analysis and risks assessment

A scenario analysis of development interventions was conducted. Scenarios included the seven main hydropower developments (existing and planned), large scale irrigation development, interbasin water transfers, increased forest cover, and these were overlaid with a range of climatic conditions.

4. Evaluation of management options

Evaluation of the economic, environmental and social impacts of the various development interventions and management options was undertaken by technical specialists and the planning team using a Multi-Criteria Analysis approach. This included assessment of cross sectoral impacts, and the risk (certainty and significance) of negative impacts.

5. Drafting and endorsement

Consultation with the interim River Basin Committee and a Leaders group was undertaken at key stages during plan development so that there would be knowledge and agreement with the plan's recommendations. After agreement by line agency and provincial agency officials it was recommended to government for endorsement

The River Basin Plan

The River Basin and included 6 Key Result Areas related to the Plan's vision and goal:
(i) Creating effective river basin management institutions and approaches including stakeholder participation and awareness raising, **(ii)** Achieving sustainable water resources management through better inventory information on surface water, groundwater and water quality, water permitting and understanding of environmental flow requirements**, (iii)** Coordinated management of hydropower development and sustainability reporting**, (iv)** Development of sustainable irrigation, **(v)** Management of priority sub-basins in the river basin according to local development pressures, **(vi)** Management of significant risks to river basin conditions which for the Nam Ngum are flooding, short and long term water quality impacts from mining, and large (hydropower, irrigation, and tailings) dams. The Plan addressed implementation issues centred upon responsibilities, linkage to national socio-economic planning, funding, monitoring and evaluation.

Issues Associated with the Nam Ngum River Basin IWRM Plan

Preparing this first IWRM river basin plan in Lao has been a useful learning experience and the approach will improve as the plan is implemented and also as other plans are developed. Issues that are under consideration or that will be addressed and progressively improved include:

National Water Resources Committee: The National Mekong Committee has been convened as the peak national body for water resources management in Lao PDR. This has an important role to play for river basin management in terms of advising on government policy and investment in River Basin management, coordinating government agencies, deciding on river basin planning priorities, guidelines, standards and in finally endorsing individual river basin plans.

National Policy and Strategy: A National Water Resources Policy and Strategy is currently under development and this will address many of the issues identified during the preparation of the river basin plan.

Enabling Laws: River Basin planning and river basin organisations are not enabled by the national law on water resources and so IWRM planning has a weak foundation. This has been recognised and a review and possible revision of the water law is planned.

Integration into the Government Planning and Decision Making Systems: The government's Five Year Socio-economic Planning process and related annual plans are the primary mechanism for initiatives to be included in the government planning and budget agenda. Some progress has been made with this during plan preparation however it remains to be seen if this is adequate.

Stakeholder Participation: Stakeholder participation was principally with national and

provincial line agencies during development of the Nam Ngum Plan. There was some involvement of the private sector and from the District and community levels and some use made of the media. Greater involvement in the planning process from these stakeholders would have benefited the Plan by better identifying the range of important issues, strengthening the measures proposed by the plan, awareness raising of water and environmental issues, and increased support for the plan implementation. As processes develop and also as the plan is implemented it is expected that this stakeholder participation will be strengthened.

Data: Good data is the foundation of good planning. At the moment, data is held independently in many different government agencies. This limits and sometimes prevents timely access. With time it is expected that there will be a government wide approach to data sharing and standards. Improving data quality is also being worked on.

>>> **SEE SESSION PLAN 6.2: THE DIFFERENCES BETWEEN PLANS AND SUB-BASIN PLANS**

>>> **SEE SESSION PLAN 6.3: FACILITATED DIALOGUE AND CONVERSATION MAPPING ON FIVE KEY QUESTIONS**

Data Analysis and Modelling: Analysing and making sense of data is essential to support river basin planning as well as to enable Lao to participate fully in international forums. Strengthening computer modelling skills and resources is needed.

Financing: A critical issue for implementing the river basin plan is funding of the various measures recommended. This could include sources such as government general revenue, resource use royalties and, in the short term international donors. The approach for adequate funding of River Basin management is yet to be decided.

Relevant material in other resources

Resource	Section
The Global Water Partnership (GWP) and the International Network of Basin Organizations (INBO) for use of: *A Handbook for Integrated Water Resources Management in Basins.*	Chapter 8
UNESCO IHP/WWAP/NARBO for use of: IWRM Guidelines at River Basin Level.	Part 2-1, Section3.3
Cap-Net, *Integrated Water Resources Management for River Basin Organisations: Training Manual*, June 2008	Module 10

Session Plan

6.6 Session Plan 6.1: the IWRM planning cycle

OBJECTIVES

At the end of this session the participants will be able to:

- Define and order the general 'steps' involved the IWRM Planning Cycle.
- Identify 3 key actions for IWRM to succeed at each identified 'step'

MATERIALS

- Flip charts
- Marker pens
- IWRM Planning sets written or printed on index cards.

TIME

- 30 minutes

PREPARATION

- Write or print IWRM planning 'steps' on index, one set of card per group.
- Draw up the IWRM planning process on several flip charts stuck together and hand in a prominent place within the training room (see Session Support Material)
- This session plan is divided into two parts depending on the time available for the session.

STEPS

Part 1:

1. Introduce the session be explaining that IWRM planning is a stepped process based on 'learning by doing' or adaptive management. Therefore IWRM planning needs to continually adapt to changing circumstances, such as political, natural and human changes. However there is also a very simple iterative process that all river basin organisations must move through in a continuous cycle of planning, action, reflection and adaptation.
2. Divide participants into small groups of 4 to 6 participants and provide each group with a set of index cards. As each group to sort the cards into a logical sequence that they think best reflects the IWRM planning process.
    - Highlight that 7 'steps' are provided on the index cards as well as 4 'principles' or constant processes must also be integrated into the planning cycle.
    - Allow 15 minutes for this process.
3. When each group has completed the small group work either: 1) continue onto Part 2 if there is time OR 2) if time no further time is available conclude the session by asking each group to present their outcomes on a flip chart and encourage all participants to review the outcomes of the other groups. Initiate a discussion using the following questions to generate a discussion.
    - What were the main similarities and differences between the group outcomes?
    - Do participants think there is a step they consider most important or are all steps considered equally important?
    - How long do participants think the full process would take to work through a full cycle?
    - Present the IWRM Planning Cycle (see Session Support material) and seek comments or questions about the proposed planning cycle, particularly where participants planning cycle outcomes differed.

Part 2:

If time is available, continue the session

4. When all groups have completed the small group exercise, ask each group to identify 1 to 3 key activities that must occur in each step. Get each small group to clearly write the identified activities next to each of the planning steps.
5. Once completed initiate a discussion around the following questions:
    - What were the main similarities and differences between the group outcomes?
    - Do participants think there is a step or activity they consider most important or are all steps considered equally important?

- How long do participants think the full process would take to work through a full cycle?
- Present the IWRM Planning Cycle (see Session Support material) and seek comments or questions about the proposed planning cycle, particularly where participants planning cycle outcomes differed.

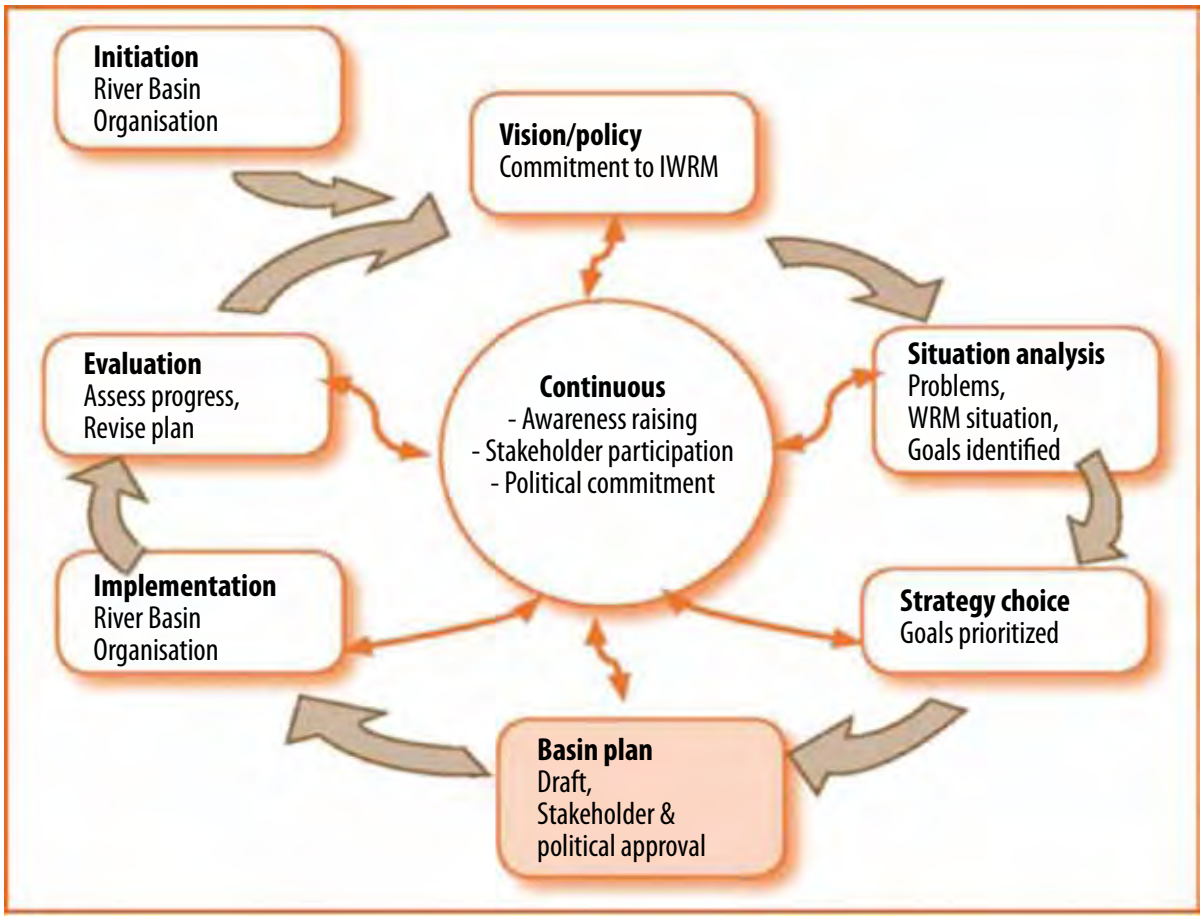
HANDOUT

Either write each of the steps below on an index card, or print each step in very large font on a single piece of paper. Print or write enough sets for each small group that will be working on the exercise.

Initiation of River Basin Organisation
Vision/policy commitment to IWRM
Water Resource Issues Assessment and Situation Analysis
Water Resource Policy/Strategy Choice
Basin Action Plan
IWRM Implementation Activities
Monitoring and Evaluation of Programs
Awareness Raising
Stakeholder Participation
Political Commitment
Capacity Building

Session Support Material

Flip Chart 1:
The IWRM Planning Process



Source: CAP-NET/UNDP, 2008: INTEGRATED WATER RESOURCES MANAGEMENT FOR RIVER BASIN ORGANISATIONS. TRAINING MANUAL, p.86

Session Plan

6.7 Session Plan 6.2: the differences between plans and sub-basin plans

OBJECTIVES

To understand the differences between basin and sub-basin plans.

MATERIALS

- This chapter of the Manual
- Paper, pens
- The following handout (next page)

TIME

- 60 minutes

PREPARATION

- Flip chart

STEPS

1. **Divide into mixed groups** – no more than two people from each country and no more than four people per group
2. **Examine the following lists;** reflect on the content of basin and sub-basin plans with respect to the water resources management functions of your country.
3. **Prepare a list** of similarities and differences between the two types of plan.
4. **Specify the similarities and differences** in the context of the Mekong River basin
5. **Prepare a short presentation** outlining your findings to the whole class

Handout for Session 6.2:

Contents of a River Basin Management Plan based on IWRM

The IWRM Toolbox (Global Water Partnership 2002) recommended that river basin plans should include information on the following items:

- Physical description of the basin
- Land use inventories
- Current water availability and demands
- Pollution source inventories
- Aquatic and terrestrial ecosystem needs
- Vulnerability to floods or extreme meteorological events
- Identification of stakeholders and mechanisms for participation
- Implications of changing land use
- Identification of priority issues (impact issues or user requirement issues)
- Short- and long-term goals for the river basin
- Water related development scenarios, future water demands + risk assessments
- Water allocation and water quality objectives
- Strategy, measures and action plans for the achievement of goals, including sub-basin management plans
- Financing of water use and management
- Responsibility and schedules for implementation
- Mechanisms for monitoring and updating
- Annexes including specific studies such as areas of significant environmental problems

Sub-basin plans

A sub-basin or land and water management plan is a tool to enact integrated river basin management and local levels. It includes priorities, actions and reporting mechanisms for implementing the overarching IRBM Plan at the lower level of the river valley or smaller catchment within river basins. Here planning

and management is at scales of 1:100,000. It includes sections or chapters on:

- Context (a review of the historical, economic, environmental and statutory context within which the Plan will work) and Scale (the size and level of application of the Plan state-wide and in districts)
- Engagement Processes - Methods used to engage and use stakeholders to build the Plan; and external auditing of engagement process.
- Water Services: Statements of present and future needs and issues; statements of present and calculations of future requirements for water services in terms of water demand and supply, for urban, rural towns, industrial, power generation and irrigation users; determinations of supply reliability in stochastic climatic and commodity environments
- Other water services - floodplain management, salinity management, groundwater management, river management, water quality management and other key issues where appropriate.
- Determinations of Management Options and Specific Courses of Action
  - development options, demand management options (structural, legal and economic (e.g. user pays solutions); iimplementation tasks, who is responsible, funding sources; coordination options with other government departments.
- Institutional Arrangements: Structure, Governance and Functioning of basin organisations - Purpose and scope, organisational arrangements, composition and representation, decision-making rules, funding and staffing, authority of each government department
- A Monitoring Programme to measure successes and failures of plan and provide accountability of government investment; congruence and linkages with state-wide state of the environment reports and/or environmental auditing and monitoring.

Session Plan

6.8 Session Plan 6.3: facilitated dialogue and conversation mapping on five key questions

OBJECTIVES

The objective is to ensure participants understand five key elements of basin planning. The purpose of the conversation mapping exercise is to engage people with different perspectives on water resources management and planning, capturing the salient aspects of the conversation. The 'trigger' for the conversation is the five questions below. Instead of just talking, participants record the essence of their contribution for others to then reflect on and make conclusions.

MATERIALS

- This chapter of the Training Manual
- Butchers' paper, coloured marking pens
- The following Key Questions:

Here are some key questions to help move forward river basin and sub-basin planning:

1. Has the basin organisation or the responsible water resources agency developed a river basin or water resources planning process? Have senior policy makers endorsed it?
2. Are there adequate data and information – economic, environmental, and social –for the planning process to be effective? Is more targeted research needed?
3. Does the planning process include genuine participatory processes for the basin community to provide input and make contributions?
4. Does the planning process include bottom-up planning to address the water-related problems and needs of local communities?
5. How do basin and sub-basin management plans incorporate risk assessment of proposed projects?

Modified from: Integrated River Basins Management: From Concepts to Good Practice. Briefing Note 7: River Basin Planning and Management. World Bank.

TIME

- 75 minutes

PREPARATION

- Handouts – 5 questions
- Butchers' paper on each table

STEPS

1. **Ensure** the whole group has read the five key questions above by requesting this be done the day before
2. **Conversation Mapping** (25 Mins)
   - Participants will be divided up into groups of 4-5, preferably form different countries. Speakers will assign themselves to each of the different groups.
   - Using a sheet of butcher's paper, a circle is drawn around the trigger idea (do one for each question,(prepared prior to the commencement of the facilitated dialogue session).
   - A participant starts the conversation with any responses that they think pertain to the question. As a person is speaking they are recording their contribution on the paper and linking it with a single line to the trigger circle.

continues on following page

- Each participant to have their own colour pen, so that their contribution is recognised. Only one person is to be talking/writing at any one time.
- Participants respond to comments writing the essence of their contribution on the paper linking it by a single line to the earlier contribution it specifically develops.
- Lines and contributions gradually 'branch-out' from the theme as it is explored. As each comment is made it is circled in order to delineate its boundaries. (Process adapted from Mackenzie, 2005).

3. **Assimilation** (40 mins) - Each group will then be allocated 10 mins to interrogate their conversation map in order to extract what they feel are the two most important issues/factors/comments/issues/actions associated with the progression of each question. Each group will then be given 5 mins to feedback to all participants.
4. **Conclusion** (10 mins). Drawing on comments made by the participants, the session will be concluded by the session facilitator.

Chapter 7
Management Tools: Monitoring and Water Information

Management instruments are the elements and methods that enable and help decision-makers to make rational and informed choices between alternative actions. These include a wide range of methods, both quantitative and qualitative, based on disciplines such as hydrology, hydraulics, environmental sciences, system engineering, legal sciences, sociology and economics (GWP IWRM Toolbox).

This chapter deals with two management tools: monitoring and water information (water resources knowledge base and water resources assessment).

Integrated river basin planning requires several information management tools to inform and support decision-making. This chapter outlines those tools.

7.1 Monitoring using key performance indicators and basin reporting

Characteristics

Monitoring the outcomes of integrated river basin planning is essential. It provides a means of reporting to basin stakeholders of the outcomes of IWRM and communicating critical issues about land and water management. Water management indicators are an important tool in the development of water policies, the setting of targets and goals and monitoring management performance. The appropriate combination of indicators helps to show how well IWRM objectives at the basin level are being met, and if necessary, can provide a tool to help reformulate policies and programmes. Indicators support transparency and enable civil society and governments to judge performance. They can also be used for benchmarking, to encourage better performance from, for instance, water service providers, and in the use of yardsticks, a parallel technique that uses the performance of a similar organisation as an indicator of performance.

Indicators and basin reporting can be used to examine and compare:

- The spatial and temporal variations in water cycle elements, such as water resources availability (m3/person/year), water use (litres/person/day).
- Efficiency of water use ('crop per drop' or ensuring the greatest value to society per m3 of water used).
- The efficiency and effectiveness of service delivery (e.g. water costs ($/m3), numbers of households served, area served by different types of irrigation system).
- Water quality and biodiversity/ecology (e.g. number of species/km2 or stretch of river, quality of surface water).
- Performance of water service providers
- Performance of the river basin organisation.

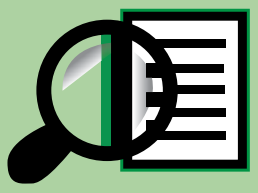
Other indicators can be developed to stimulate water resource management reforms. Such indicators might try to assess links between water provision and poverty, or the equity of allocation of water across sectors, by looking at the social and economic value in use.

Indicators have a role at several levels, including at river basin or catchment levels or across shared boundaries and internationally. However, a reliable data collection system that reflects government's priorities and societal needs is an important precondition. Basin organisations play a lead role in monitoring overall basin condition and the impact of policies (national and transboundary) and river basin and sub-basin plans.

Lessons learned

Experience with developing indicators and basin reporting has shown that:

- While devising representative indicators is relatively easy, it is often difficult to collect consistent, reliable and meaningful data to illustrate the performance in reaching the desired goal.
- Although simple indicators may fail to reflect important variations, they are powerful tools for creating awareness and political will.
- Indicators are best used in 'clusters', as a combination of indicators will better present the 'whole story' essential for IWRM. The appropriate combination will depend on local circumstances.
- Where indicators are used to compare different regions, countries or water utilities, it is essential that the data elements of the indicator are precisely defined.
- Values of indicators or indices should be reviewed critically, e.g. outlier values of an index need to be investigated and explained.



Emerging Indicator Framework of the Mekong River Commission

Description

To support earlier basin planning activities, the MRC developed an Integrated Basin Flow Management (IBFM) approach to predict the impact of three flow change scenarios on the ecological, social, and economic status of the Mekong Basin. The assessment process is summarized on the following page.

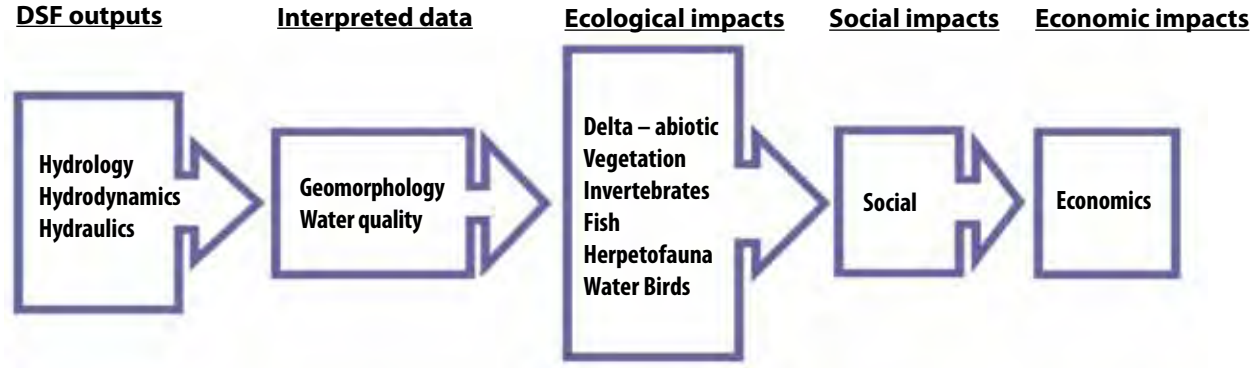
Each of the graph's 13 issues were described in terms of a number of indicators, such "annual low water level", "number of islands at annual low water level", "terrestrial plant productivity", "abundance of snails", "nutrient related health" and "economic value wetlands". **In total 139 indicators were assessed by a group of experts for each of the three flow situations.** The results of the assessment, which were largely qualitative in nature, have supported the development of technical guidelines that are to support the "Procedures for the Maintenance of Flows in the Mainstream" (PMFM).

Lessons learned

1. Not all of the indicators pioneered under the IBFM approach are relevant or efficient for basin development planning. For the current planning process 13 assessment indicators were selected that are policy relevant (i.e. clearly related to specific development objectives, user driven (i.e. understandable and meaningful to decision-makers and the public), sensitive to water resources development, and can be reasonably readily "quantified". The selected indicators cover the triple bottom line of economically beneficial, socially just, and environmentally sound development, as well as equitable development with respect to being mutually beneficial to the LMB countries.
2. Nevertheless, there are parts of the current assessment framework for basin planning that rely on expert opinion and it is in these areas in particular that the IBFM approach provides a particular advantage.
3. There is scope for the development of a coherent indicator framework that supports several core MRC functions and products, such as: (i) basin planning indicators for basin-wide scenario assessment and the executive summary of the State-of-Basin Report, such as "number of people in/out of poverty", (ii) supporting indicators for sub-basin assessments and topic chapters of the State-of-Basin Report, such as "dependency and resilience ratios", and (iii) monitoring parameters for the MRC datasets, such as "demographic and health statistics". Such an integrated MRC monitoring and assessment framework is currently being developed.

>>> SEE SESSION PLAN 7.1: INDICTORS AND BASIN REPORTING

The assessment process



Case Study

State-of-Basin Reporting (Mekong River Basin)

Description

The first State-of-Basin Report of 2003 of the Mekong River Commission provides in 300 pages an introduction to the geography, hydrology, plant and animal life of the Lower Mekong Basin, as well as the social and economic circumstances of its peoples. It also reviews key economic, environmental and social issues related to fisheries, agriculture, forestry, hydropower, trade and transport, domestic water and sanitation, as well as flooding. The preparation was a major undertaking, which lasted almost 1.5 years and involved more than 60 staff, consultants and advisors.

The IWRM-based Basin Development Strategy, which will be adopted by its Council in 2010, states that the State-of-Basin Report should become one of the prime sources of information that informs how well the Strategy is implemented, and guides whether it requires adjustment. Therefore, the State-of Basin would have to be updated every five year, in advance of a full review of the IWRM-based Basin Development Strategy.

Lessons learned

1. For ease of preparation, the scope of the State-of-Basin Report needs to be narrowed down to the "status and use of water and related resources". Indictors should be agreed that can describe the status of each the water-related resources, the use of these resources, and the pressures on these resources, and can be easily updated every five years, based of MRC's transboundary monitoring programmes and the information obtained through the implementation of the procedures under the 1995 Mekong Agreement.
2. The changes and trends in the various indicators should be shown in diagrams and associated explanation, which can be easily understood by non-technical basin's stakeholders.
3. Possible controversial information related to policies, management, cooperation, etc. should be left out. Such aspects can be better addressed in other reports.

7.2 Water resources knowledge base

Characteristics

This tool covers the collection and storage of data on the hydrological cycle (quantity and quality) and access to physical, socio-economic, demographic and water use data in a cross-sectoral perspective. The need to share knowledge is growing rapidly in a world where the Internet and email allow for ease of interaction as never before. The holistic nature of IWRM requires constant knowledge exchange by water stakeholders, and especially professional water practitioners.

Hydrological and meteorological offices routinely collect data on elements of the hydrological cycle, and data links can be established to ministries or other institutions with other data collection responsibilities (e.g. Agriculture, Planning, Statistics, Lands, Local Government, and Environment). Given agreed formats, direct downloads for use in service programmes and GIS can be made using contemporary data technologies and the Internet.

Water resource knowledge bases and links need to be built up considering the associated priority issues that have to be dealt with, such as human health, ecosystems health, land use impacts and forest cover, sectoral competition for water, vulnerability to floods and droughts, demand and willingness to pay. An assessment of the risks and damages involved when decisions are made based on inadequate information can help to determine priorities in developing the knowledge base. It should be noted that water quality is often very poorly monitored and weakly presented in knowledge bases, putting such sectors as environment and health at a disadvantage in situations where basic knowledge is required.

Building a knowledge base into an effective tool requires consistent, routine work over large areas and many years. It also requires the development of working relations and data exchange between sector institutions representing either impacts on water resources or use of water resources. Thus it is important that data collection staff work in a co-ordinated fashion with those working on water resource assessment, so that data continues to be relevant to current problems, adequate for the assessments (see below) and so that data users can rely on the quality of the data.

Data need to be converted into information and knowledge which in turn feeds into decision support systems, assisting management in addressing priority issues.

Lessons learned

- A knowledge base is fundamental to water resources assessment and subsequent decisions.
- It is essential that policy makers appreciate the importance of reliable and representative data, create the necessary institutional responsibilities and make appropriate allocations of financial and human resources reflecting local needs.
- Prioritisation of data needs based on key water issues and assessment of risks and damages can help to develop political support and resources.
- When data needed for water resources assessment are collected by a number of different organisations, their systems need to be compatible in terms of standards, quality assurance, electronic access and transfer.
- Cross-sectoral collaboration is essential to obtain the broad knowledge base needed for IWRM approaches.
- Quality assurance is basic to the usefulness of the knowledge base and in particular in transboundary situations where mutual confidence building and credibility is

Case Study

Master Project Database (Lower Mekong Basin)

Description

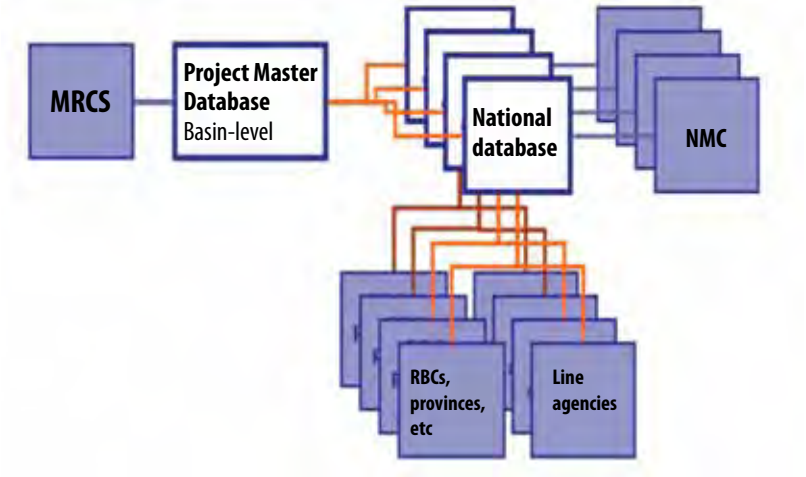
During the first phase of the Basin Development Plan Programme (2002-2006), a central MRCS/BDP database in Microsoft Access was developed. By March 2005, the project database was populated with more than 300 project proposals. Most proposals were identified through sub-area planning activities.

More recently, during workshops under the Basin Development Plan Programme Phase 2, it became apparent that there is demand for the developing the project database further to contain the key characteristics of existing, planned and potential water-related projects for water resources planning and management at the basin, national and sub-basin levels:

- At the national level there is a desire to have a national database, which will serve the purpose of coordinating information on existing and planned water-related developments between line agencies, river basin committees, and others.
- There is a fundamental need within the MRC to maintain a record of existing, planned and potential future water uses in the basin to facilitate the implementation of the water utilization procedures under the 1995 Mekong Agreement.
- And in the basin-wide planning process, facilitated by the MRC/BDP, requires the storage of information of water - related programmes, projects, and initiatives that come from sub-area analysis and sector reviews to support the periodic updating of the IWRM-based Basin Development Plan.

To foster ownership amongst the countries and to support the processes of sub-basin and national planning and to integrate these with basin-level planning, it is proposed to build on existing databases to develop a Project Master Data Base, as shown in the illustration. The foundation of the Project Master Data Base will be the four compatible national databases, which would be housed in the national water resource management agencies. Data entry will be made very user-friendly. Submission of the project data will be facilitated in various ways, including by e-mail attachment.

Figure 7.1 Proposed family of project databases



Importance of case for IWRM

1. The Project Master Database will be an important tool for basin-wide monitoring and planning of water use, and the associated coordination and information sharing between water-related sectors.
2. A common format for the databases will make it easier and thus encourage the sharing of information between countries and with those engaged in basin-level assessments and planning.

Case Study

Information System (IS) of the Mekong River Commission

Description

The MRC Information System (IS) is a repository of data and information. It contains:

Historical data and Information, which are required for the analysis of past events in order to uncover the structure and pattern of the regimes in the Lower Mekong, to analyse the incidence and severity of extreme events, their risk of occurrence and their linkages with synoptic and climatic conditions. Historical data are also required for understanding long term trends, calibrating and testing models and evaluating socio – economic impacts on the basis of past events.

Present data and Information, which are needed for monitoring purposes, for real time assessment and prediction, and as the inputs to models. They are required continuously and some in near real time from the telemetry network for forecasting.

Future data and Information, which are the outputs from models, needed for forecasting, post analysis and planning.

The comparative advantage and value-added of MRC is that it combines information from several countries, like extensive accumulated data and information about hydrology and environment of the Mekong River Basin; modelling tools; the potential for contributing to improved quality assurance and regional harmonization of data and information; and provides the facilities for collection and dissemination of data and information from/to national agencies and the user community.

The system is designed to detect and report failures and potential errors using a combination of software filters and expert surveillance that will check the integrity of the data vectors.

A comprehensive process is undertaken to ensure that all critical data streams and existing historical archives are inventoried to fully integrate them into the IS. Agreements are reached with the member countries on standard data and collection methods so that the systemic inconsistencies between data from the different countries can be eliminated. Sound data analytical/statistical support is used, particularly with regard to data validation, treatment (gap filling, correction/flagging of error and so on), quality assurance and numerical analysis.

Lessons learned

1. Central to the success of the Information System is therefore the ability to handle a wide variety and large volumes of data dependably, deliver it efficiently and reliably through a quality management process to the user community and also provide it operationally to software, for example in the cases of forecasting and modelling.

2. IWRM requires substantial amounts of historical, present and future data and information about the physical, socio economic and environmental areas and the services enabling access and use to ensure sustainable development of the LMB.

7.3 Water resources assessment

Characteristics

Water resources assessment (WRA) is a tool to evaluate water resources in relation to a reference frame, or evaluate the dynamics of the water resource in relation to human impacts or demand. WRA is applied to a unit such as a catchment, sub-catchment or groundwater reservoir. It is part of the IWRM approach, linking social and economic factors to the sustainability of water resources and associated ecosystems. Depending on the objective of the assessment, WRA may look at a range of physical, chemical and biological features in assessing the dynamics of the resource.

Traditional water resource assessment aimed to provide the basis for the supply of infrastructure to meet projected needs. Assessments have a much wider remit in an IWRM perspective, incorporating cross-sectoral tools such as:

- Demand assessment, which examines the competing uses of water with the physical resource base and assesses demand for water (at a given price), thus helping to determine the financial resources available for water resource management.
- Environmental impact assessment and Strategic impact assessment collect data on the social and environmental implications of development programmes and projects. EIA is an important tool for cross-sectoral integration involving project developers, water managers, decision-makers and the public. It can be seen as a special form of water resources assessment.
- Social impact assessment, which examines how social and institutional structures affect water use and management, or how a specific project might affect social structures.
- Risk or vulnerability assessment, looking at the likelihood of extreme events, such as flood and droughts, and the vulnerability of society to them.
- WRA links to the Water resources knowledge base and is a basic input to the planning process. Demand forecasting should use techniques that uncover, for instance, willingness to pay for water at given prices, and further economic analysis will help reveal the true nature of competing water uses. Demand management will also influence the outcome of WRA.

Lessons learned

- A water resources assessment often needs to be carried out in several steps of increasing complexity. A rapid water resources assessment may help identify and list the most important issues and identify priority areas. On the basis of this early assessment, more detailed investigations may be required.
- Assessments for large or long-term projects need to include examination of changes in land use and possible soil degradation as well as climate variability and change.
- Linking water resources assessment to EIA has been shown to build cross-sectoral linkages and heighten awareness of key issues.
- Strategic impact assessment can help in the analysis of change capacity of a river basin, to protect both quantity and quality.

>>> SEE SESSION PLAN 7.2: WATER RESOURCES ASSESSMENT

Case Study

Water Resources Assessment and Key Water Resources Development Issues of the Lower Mekong

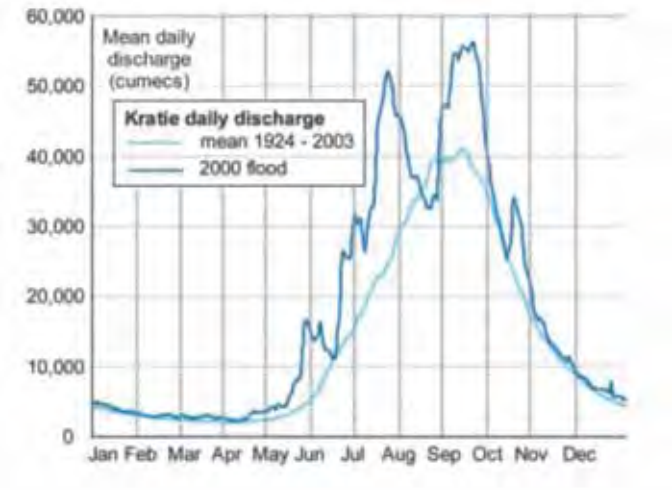
Water resources assessment, resources and livelihoods

The water resources of the Lower Mekong Basin are described in some detail in the MRC 'State of the Basin Report' (MRC 2003), in the Overview of the Hydrology of the Mekong Basin (MRC 2005), in the Strategic Plan (2006 – 2010) and in the MRC 'IWRM Strategic Directions (2005)'. In strategic terms, important characteristics of Mekong water resources include:

Abundance: Annual runoff averages around 475 km3/year. Per capita resources currently stand at over 8500 m3/person/year which is 'plentiful' compared with most other international river basins.

Low level of exploitation for extractive uses: Water infrastructure development is limited compared with most other large river basins.

The 2000 flood hydrograph recorded at Kratie, Cambodia compared to the mean daily discharges for the period 1924 to 2003



High Use in the Delta region: Viet Nam uses virtually all the dry season flow that enters from Cambodia but this has no water quantity impacts on the other countries.

High dependence on in-stream uses (particularly by the poor): The Mekong fishery is the largest inland fishery in the world, estimated to be worth at least $US 1.4 billion annually, and providing the major protein source for many people in the basin. Inland navigation is an important mode of transport for many areas where road access is limited.

Extreme seasonality: In most parts of the Basin, flows in the driest three months constitute less than 10% of total annual flows; while flows in the wettest three months make up over 50% of total annual flows (see the figure below).

Importance of the flood pulse for the ecology of the floodplain and the Mekong fishery: During the wet season, between 1 and 4 million hectares of floodplain are submerged, including the Tonle Sap Great Lake. This 'flood pulse' in and out of the Great Lake is a very important trigger in the fish breeding cycle.

Existing mainstream flow regime closely approximates natural regime despite even allowing for existing development. This highlights the large natural flows from the upper basin in China and Lao PDR compared with present usage.

Dry season water shortages: Dry season shortages can occur as a result of the rainfall seasonality, concentration of extractions in the driest period and drought events during the onset of the wet season.

Water quality in the mainstream is generally good, and is rarely a constraint to water use. The exception is saline intrusion, acid sulphate drainage and pollution in intensively used areas of the Viet Namese Delta.

Groundwater resources are very widely used as a source for domestic and industrial supply. Use for irrigation is limited, but expanding. Groundwater systems in the flood plain are closely coupled to the river.

Upper Basin flows (from China and Myanmar) constitute around 18% of total Mekong flows. The proportion is higher in the dry season, when snow melt contributes a significant component of flow. The dry season flows will increase due to the re-regulation of flows from the cascade of hydro-power storages now being developed in China.

Water resources development issues

In 2009, the total population living in the Lower Mekong Basin was estimated at 65.7 million, the majority living in rural areas. Many of these people are farmers who supplement what they grow with the fish they catch and the food and other materials they gather from forests and wetlands. This makes the ecology of the lower basin unique in terms of its contribution to livelihoods, particularly of the poor.

The majority of Cambodia's and Lao PDR's land area and population lie within the basin. Moreover, nearly 40 percent of the people in Cambodia and Lao PDR living in the basin have incomes below the poverty line. Comparatively, the Thai portion in the basin holds only about 40 percent of the national population, while in Viet Nam, 20 percent of the country's population lives in the Mekong Delta or the Central Highlands. However, poverty rates are also high in parts of Thailand and Viet Nam that lie within the basin. Projections suggest that by 2020 the basin's population will reach 77.8 million. These conditions along with increased longevity mean that overall population growth will remain significant. Population projections are shown in Table 7.1.

Larger populations increase pressure on per capita resources, especially land and water. It further complicates the balance between, on the one hand, the need to develop land and water resources for increased productivity and poverty alleviation (and all the related aspects such as transport, roads, industry), and on the other, acceptable protection of the basin's ecology which will need to support an increasing rural population.

This emphasises the importance of the relationship between 'resources and livelihoods'. This means close consideration of issues such as:

1. Early identification of basin wide environmental consequences of development options using SEA/ CIA approaches, so that protection or mitigation measures can be included in planning.
2. Valuation of environmental and livelihood benefits from in-stream uses of water.
3. Improved knowledge about cause-effect relationships and management options for ecosystems.
4. Identification of key habitats for protection.
5. Assessment of ecological water demand of the riverine systems of transboundary nature, particularly for key locations such as Tonle Sap Lake and high value wetlands.
6. Integrated water and land use planning, for flood plain areas of transboundary significance and consideration of impacts on water resources.

Table 7.1 Projected population growth of the Lower Mekong Basin

Portion within Mekong Basin	Current Population (million)	Annual Growth Rate (%)	Population in 2020 (million)	Source
Cambodia	14.6 (2007)	2.5	20.1	www.unescap.org
Lao PDR	6.2 (2007)	2.9	7.7	www.unfpa.org
Thailand	22.7 (2009)	0.9	24.4	www.nso.go.th
Viet Nam	22.2 (2006)	1.3	25.6	www.geohive.com
Total	65.7	2.0	77.8	

Water resources development
Average annual withdrawals in the LMB are estimated at around 60,000 MCM, or 12% of total annual flows. Mainstream water resources development up to the present has mainly occurred in the most downstream portion of the Basin, in the Viet Nam delta. Diversions from the mainstream above the Viet Nam delta are so far negligible in terms of the impact on the dry season flow regime on the mainstream. Existing dams and storages are not significant when considered in relation to the basin's average flow; storage of water resources corresponds to only about 2% of the average annual flow.

Agriculture is the most dominant water related sector, particularly in Thailand and Viet Nam. However expansion of the present levels of irrigation is limited by the unavailability of 'surplus' dry season flows. In the Viet Nam delta, virtually all the dry season flow is utilised. The hydropower potential is large and only about 5% of this potential has been developed to date. Navigation is an important sector but is largely undeveloped in the sense that it is occurring naturally and so far, not as an integrated transport sector.

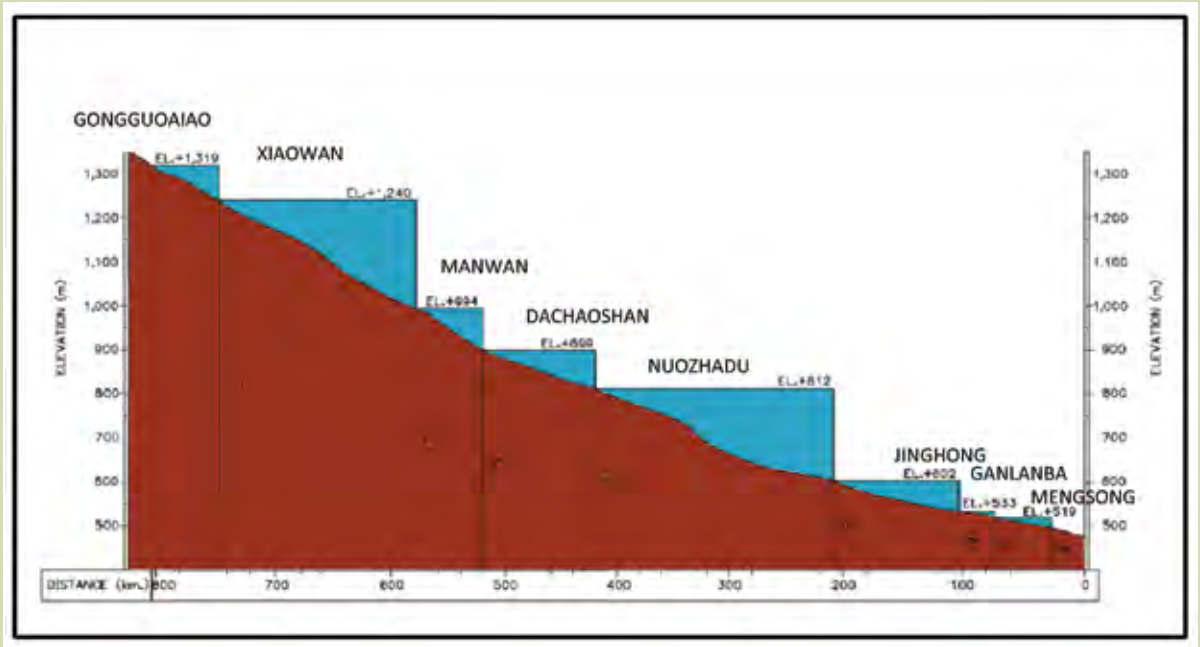
While the developments so far on the tributary streams have had some localised impacts, the impacts on the flow regime of the mainstream are insignificant. The large or macro scale of a large international river basin such as the Mekong means that significant local impacts on flows are 'drowned out' by the overall magnitude of the basin's total flows. The impacts of land use change also become undetectable as geographic scale of the basin increases, despite the fact that regional deforestation has been significant and increasing from the 1960's.

So at the basin scale, there is as yet no statistical evidence of man-induced change to the hydrological regime of the Mekong mainstream, which can thus be considered to be in, or very close to, its natural state. The main environmental impacts of water related development to date are the problems of acid sulphate soils and saltwater intrusion in the delta. There also have been environmental problems on some of the tributaries, caused by uncoordinated hydropower scheme operations and some sedimentation from uncontrolled de-forestation in tributary catchments. As well, there are some localised impacts from some industries, such as mining. But these are localised and not so far of basin wide significance.

However, the cumulative impacts of the planned levels of resource development are expected to significantly modify the hydrological regime of the mainstream over the coming decades. Water resources development is now accelerating, in particular for the generation of hydro-electricity, driven by markets and the private sector, but also for expanding and improving irrigated agriculture, driven by food security concerns inside and outside the region.

In the Upper Mekong Basin, China is completing its hydropower cascade on the Lancang (Figure 7.1). In particular the Xiaowan and the Nuozhadu hydropower projects, with 9,800 and 12,400 million m3 of active storage are likely to cause a very significant seasonal redistribution of flow, particularly increasing the dry season water availability and opening up the possibility for major expansion of irrigation in the LMB.

Figure 7.1 Profile of the hydropower cascade on the Lancang in China



For example at Vientiane, based on the modelling of the 'China Dams' scenario, dry season flows will increase by more than 30%. Also in the four LMB countries about 10 large (> 10 MW) hydropower projects are under construction and many more are planned, including 11 projects on the mainstream. Many of these projects include significant reservoirs which can further increase dry season flows through flow re-regulation.

There are also plans for large increases in irrigation, to improve navigation (see Table 7.2 on the following page), reduce damages of floods, and improve public water supply. For example, Lao PDR plans to increase wet season irrigation from the current 170,000 ha to 450,000 ha and dry season irrigation from 100,000 to more than 300,000 (see the table below). Cambodia has considerable scope for agricultural development; large irrigation expansions are being studied, in particular in the largely undeveloped Cambodian delta, linked to major investments in flood control, and elsewhere, linked to hydropower development. Water transfers from the Mekong have long been considered by Thailand to complement national approaches to alleviate droughts.

Development plans of this size and scope bring with them both 'synergies', or complimentary effects between projects, and 'trade-offs', where benefits for one area or activity create disbenefits for another. For example there can be synergies between hydropower, irrigation and upland watershed management - with some benefits occurring for all - as opposed to 'trade-offs' between say, hydropower development, and fisheries health and productivity.

Trade-offs in particular require much analytical work and negotiation between countries, or between sectors, to find the 'middle ground' or 'balancing point' which all key players and stakeholders are prepared to agree to. This requires strong IWRM understanding and capabilities across the basin, and across institutions, and time for consultation and to develop preferred negotiating positions. At the basin scale, integrated water planning is now only becoming a reality (this strategy document is playing a key role), and there are still fragmented water related responsibilities between national agencies, and development still tends to be sector driven.

Trade-offs at the transboundary level will largely be about hydropower benefits from mainstream dams, on the one hand, and the disbenefits caused by the blockage of fish migration routes by this infrastructure. This will relate to 11 run-of-river' projects and in particular, to the 6 of these projects that are below Vientiane. There is

also substantial irrigation expansion proposed within the Cambodian delta flood plain and the trade-offs between irrigation production and improved livelihoods for some, must be compared with the loss of flood storage (from the banked development) and the impacts on fish movement and breeding and downstream flood levels. All the other development components within the 'foreseeable future' scenario are likely to be able to proceed without any significant transboundary impacts.

Table 7.2. Planned increases in irrigated agriculture

Country	Increases in irrigation in the dry season (hectares)		
	Current situation	20- Year Plan Scenario	Increase in %
Lao PDR	99,319	332,646	235
Thailand	171,768	279,831	63
Cambodia	260,815	378,012	45
Vietnam	740,304	740,304	0
LMB total	**1,272,206**	**1,730,793**	**36**

Relevant material in other resources

Resource	Section
The Global Water Partnership (GWP) and the International Network of Basin Organizations (INBO) for use of: *A Handbook for Integrated Water Resources Management in Basins.*	Chapter 9
UNESCO IHP/WWAP/NARBO for use of: IWRM Guidelines at River Basin Level.	3.2.1 and 3.4.2
Cap-Net, *Integrated Water Resources Management for River Basin Organisations: Training Manual*, June 2008	Modules 7 and 8

Session Plan

7.4 Session Plan 7.1: indicators and basin reporting

OBJECTIVES

- To evaluate existing basin IWRM governance indicators, as listed below in this session plan.

MATERIALS

- The hand out at this end of this Session Plan
- Flip chart, paper, pens

TIME

- 60 minutes

PREPARATION

- Flip chart – ready to record responses

STEPS

1. **Examine** the 29 indicators in the list below – encourage participants to read these the night before.
2. **Divide** the class into groups of 2-3.
3. **Prepare** a SWOT analysis of the case study assessment:
   a. Strengths
   b. Weaknesses
   c. Opportunities
   d. Threats
4. **Summarise** each of the SWOT components into three key items
5. **Present** the 3 key items for each SWOT component to the whole class
6. **The whole group votes** on the top 3 items for each component.
7. **Discuss** the results.

COMMENT

- The session requires the leader to ensure that all participants:
  - Understand what each component of SWOT means
  - Each participant's responses are considered
  - There is adequate time to capture all responses
- S/he needs to explain these items prior to starting the session or during if the questions about these arise.

Indicators of IWRM for transboundary basin organisations

Source: Bruce Hooper & Associates/IOEAU Project - IWRM Indicators for African Transboundary Basin Management bphooper@gmail.com

ID #	Indicator	GLOSSARY - Meaning of each indicator
PRINCIPLE 1: POLITICAL PROCESSES		
G1	**Political connection**	Senior staff of the basin organisation are closely linked to the senior politicians and administrators of each basin State Member
G2	**Build on international experience**	The basin organisation uses pre-existing international relationships, such as development agreements and protocols, as a means of enacting whole of basin management plans
G3	**Benefit sharing**	There exists a benefit sharing mechanism to equably share water resources across international borders and harmonise actions in national water management plans of the basin countries
PRINCIPLE 2: EFFECTIVE FINANCIAL MECHANISMS		
G4	**Ongoing financing**	Financing for basin management exists and is ongoing despite changes in the administration of each basin country
G5	**Sufficient funding**	Funding for basin management is adequate to address at least priority natural resources management issues
G6	**Financial efficiency**	Mobilisation of fundings within the basin, thanks to the basin organisation activities is high, compared to functional costs of the BO itself
G7	**Self-funding**	Funds are collected from basin water users and used for operational activities and / or investments within the basin
G8	**Investment guidelines**	Funding for river basin management operates within "investment guidelines", which prescribe outcomes in transparency, accountability, benefit shares & sustainability (poverty reduction, economic development & environmental flows)
G9	**Reporting investments**	There are explicit procedures which ensure transparent reporting of the results of investing in basin management programs at all levels (local /district, national and international)
G10	**Donor coordination**	Coordination between donor organisations exists to ensure programs and projects are linked, do not duplicate actions and address common goals

ID #	Indicator	GLOSSARY - Meaning of each indicator
PRINCIPLE 3: WORKABLE REPRESENTATION		
G11	**Representativeness**	All basin countries are members of the basin organisation
G12	**Roles and responsibilities**	There is clear specification in the institutional arrangements for basin management of the roles and responsibilities of the stakeholders in each basin country
G13	**Gender equity - employment**	Processes exist which give equal opportunity for women to participate in decision-making in all levels of the basin organisation
G14	**Local water user participation**	Mechanisms exist which allow water users at the lowest level to participate in the decisions of basin organisations
G15	**Representation of powerless peoples**	mechanisms exist to include under-represented and powerless groups in local land and water management decisions
PRINCIPLE 4: A SUPPORTIVE LEGAL SYSTEM		
G16	**Basin organisation legislation**	Legislation exists which specifies whole of basin functions, structure, financial base & accountability mechanisms for the basin organisation
G17	**Use of national water legislation**	National water legislation not only exists but is practised and enforced, including local levels for monitoring and compliance (water extraction, pollution)
PRINCIPLE 5: EXCELLENCE IN PLANNING		
G18	**Clear planning processes**	There is a planning process with well-defined objectives, mutually beneficial goals and development priorities, all stated in a long-term integrated basin management plan
G19	**Plan implementation and completion**	There is evidence that stages in the basin management plans are completed
PRINCIPLE 6: FUNCTIONAL COORDINATION		
G20	**Overarching reporting mechanism**	The basin organisation reports the results of national water resources management plans to each basin government's high-level water administrators
G21	**Consensus-based decision-making**	Benefit sharing mechanisms for water sharing uses a consensus approach to broker agreements between members states and on a whole of basin basis
G22	**Transparent monitoring**	Each basin country's water sharing procedures use transparent monitoring mechanisms to account for activities
G23	**Range of coordination tools**	A range of tools, such as dialogues, memoranda of understanding, or joint programs of action are used to manage water between basin countries

ID #	Indicator	GLOSSARY - Meaning of each indicator
PRINCIPLE 7: EFFECTIVE MANAGEMENT TECHNIQUES		
G24	Strong leadership in basin organisation	There is strong leadership in the basin organisation and the leadership works to continuously upgrade the capacity of the basin organisation's staff
G25	Realistic management	The roles, responsibilities and functions of the basin organisation reflect current realities rather than generic principles
G26	Effective communication processes	There exists clear communication processes between stakeholders within the basin organisation to deliver outcomes
PRINCIPLE 8: A SUPPORTIVE INFORMATION SYSTEM		
G27	Information management system	There is an affordable information system to support the decisions of the basin organisation
G28	Information management protocols	There is a process to specify the type of information needed, how it is presented and the timing of information exchange in the information management system of the basin organisation
G29	Integrated information management	Information is integrated on a spatial platform: a resource management atlas in a GIS provides basinwide and sub-basin environmental characteristics, problems and best management options

Session Plan

7.5 Session Plan 7.2: water resources assessment

OBJECTIVES

- To evaluate an existing water resources assessment procedure.

MATERIALS

- Chapter 7 of this Manual
- Flip chart, paper, pens

TIME

- 60 minutes

PREPARATION

- Flip chart – ready to record responses

STEPS

1. Examine the case study in this chapter entitled, 'Water Resources Assessment and Key Water Resources Development Issues of the Lower Mekong' – require that this be read the night before this session.
2. Divide the class into groups of 2-3.
3. Prepare a SWOT analysis of the case study assessment:
   - Strengths
   - Weaknesses
   - Opportunities
   - Threats
4. Summarise each of the SWOT components into three key items.
5. Present the 3 key items for each SWOT component to the whole class.
6. The whole group votes on the top 3 items for each component.
7. Discuss the results.

COMMENTS

- The session requires the leader to ensure that all participants:
  - Understand what each component of SWOT means
  - Each participant's responses are considered
  - There is adequate time to capture all responses

S/he needs to explain these items prior to starting the session or during if the questions about these arise.

Chapter 8
Management Tools: Impact Assessments

Management instruments are the elements and methods that enable and help decision-makers to make rational and informed choices between alternative actions. These include a wide range of methods, both quantitative and qualitative, based on disciplines such as hydrology, hydraulics, environmental sciences, system engineering, legal sciences, sociology and economics (GWP IWRM Toolbox).

This chapter deals with the management tool of impact assessment. There are several types of impact assessment (Table 8.1).

Many river basins in emerging economies are experiencing increasing pressure to develop their water resources. This in response to multiple demands: more agricultural production for food and fibre using irrigation, greater levels of water use from increasing industrialisation and urbanisation and the need for greater power yields by increasing the number and size of hydro-electric dams.

This chapter draws directly from two resources: the Global Water Partnership's tools on risk assessment and World Bank's guidelines for the notification and evaluation of projects. Reference are included in the chapter and at the end of this Training Manual.

To address this issue, river basin planning and sub-basin planning can:

- Assess the existing status of water use and availability,
- Assess the development 'window' beyond which sustainable water resources management is not possible'
- Identify current and proposed developments, and develop their 'water footprints'
- Create and follow a proposed schedule of actions
- Develop risk assessment (including environmental, social and economic assessments) of proposed projects
- Develop mitigation strategies for proposed projects

In this chapter, we will examine these activities.

8.1 Introduction to impact assessment

Environmental impact assessment of proposed projects

Environmental Assessment (EA) is a tool for anticipating the environmental effects of proposed projects, enabling the incorporation of management or control measures into project and policy design. It is routinely used all around the world to improve the planning of projects and is increasingly being used to examine strategies, policies, plans, and sector programmes, when it is known as Strategic Environmental Impact Assessment (SEIA) or Strategic Environmental Assessment (SEA). EA is required when projects are likely to have significant effects on the environment. Criteria for deciding whether projects should be subject to EA include:

- The size or scale of the project (e.g. described by design capacities) including multi-objective projects
- The sensitivity of the affected area (e.g. wetlands, wildlife habitats and biodiversity)
- The character or complexity of the likely impacts (e.g. physical impacts from hazardous wastes or social impacts (for instance in resettlement schemes).

The basic methodology of EA is to study the environment in which a project is planned (the "baseline"), describe the activities that will take place during each phase of a project (i.e. the construction, operation and decommissioning), describe the likely environmental impacts and, where significant adverse impacts are predicted, develop an Environmental Management Plan (EMP) to mitigate them. A programme to monitor changes from project impacts in environmental parameters forms part of the EMP.

Impacts of particular importance in many IWRM projects are:

- Projected quantitative changes in availability of water for beneficial uses, such as fisheries, recreation and tourism, potable water supply, irrigation and industrial use.
- The extent to which receiving water quality standards and/or other beneficial use objectives will be achieved.
- The length of stream or expanse of lake or coastal waters that will be positively or negatively affected by any discharges, and the magnitude of the changes in water quality parameters.

Table 8.1 General definitions of different impact assessment (IA) tools and methods

EIA	**Environmental Impact Assessment**	"The process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made." The EIA is closely connected to the triple bottom line approach emphasising environmental, social and economic aspects.
EA	**Environmental Assessment**	EA is a systematic process to examine, evaluate and document potential impacts of proposed developments so that they can be taken into consideration during the decision making process, and uses the term as a collective term for project-level Environmental Impact Assessment (EIA), programme, policy and plan-level Strategic Environmental Assessment (SEA) and for the assessment of cumulative impacts (Cumulative Impact Assessment - CIA)
CIA	**Cumulative Impact Assessment**	CIA can be defined as "a systematic procedure for identifying and evaluating the significance of effects from multiple activities. The analysis of the causes, pathways and consequences of these impacts is an essential part of the process". Cumulative effects are the net result of environmental impact from a number of projects and activities.
SIA	**Social Impact Assessment**	SIA includes the processes of analysing, monitoring and managing the intended and unintended social consequences, both positive and negative, of planned interventions (policies, programmes, plans, projects) and any social change processes invoked by those interventions. Its primary purpose is to bring about a more sustainable and equitable biophysical and human environment.
SEA	**Strategic Environmental Assessment**	SEA is usually defined as a process of anticipating and addressing the potential environmental consequences of proposed initiatives at higher levels of decision-making, and evaluating the interlinkages with economic and social considerations. SEA aims at integrating environmental considerations into the earliest phase of policy, plan or programme (P/P/P) development, on par with economic and social considerations. SEA can consist of family of different approaches using variety of tools and making use of participatory process.

- Public health impacts from chemical or bacteriological pollution
- Socio-economic impacts (Social Impact Assessment below).

Table 8.1. Provides a list of impact assessment tools and methods

Lessons learned

The best results are often reached when EAs of progressive levels of detailing are mainstreamed in the planning, design and implementation process allowing early consideration of alternative schemes and adjustment of project designs at times when most flexibility exists. Once the design and sitting of a development are complete, any further mitigation of environmental effects will rely on "end-of-pipe" adjustments or compensation provisions, and these are usually the most costly and the least effective environmental management options.

EA facilitates public consultation by providing a context in which the public can both learn about and express opinions on development proposals and their envisaged effects. People potentially affected by the project can exert influence to reduce adverse impacts, maximise ancillary benefits and ensure that they receive appropriate compensation.

EA allows the consent granting authority to make better decisions, such that environmental (and social) costs and benefits are considered alongside the technical and financial costs and benefits. Conditions that ensure the most efficient use of resources can appropriately be incorporated into the EMP.

Social impact assessment of proposed projects

Social Impact Assessment (SIA) or Social Assessment (SA) is a tool used for ensuring systematic analysis of social impacts of a proposed project, particularly if these are varied and extensive, and/or a proposal is expected to attract extensive opposition. Social impacts include all social and cultural consequences to human populations of any actions that affect the ways in which people live, work, play, relate to one another, organise to meet their needs, and generally cope as members of society. SA has long been used by social scientists for analysing the conditions, causes and consequences of social phenomena and social life.

SA is useful to examine the impacts of structural reforms such as privatisation of state owned enterprises, agricultural reform, reform of basic services, utility reform, civil service reform and fiscal policy. It is also used for large and complex projects (e.g. dams and impoundments, wetlands management). An SIA study will consider population impacts, community/ institutional arrangements, communities in transition, individual and family level impacts and community infrastructure needs.

SA is particularly useful for assessing:

- How the costs and benefits of reforms are distributed among different stakeholders and over time.
- How specific groups such as the poor are able to cope with reforms, both physical and institutional, and access market opportunities
- How assets (physical, financial), capabilities (human, organisational), economic and social relations (e.g. gender, exclusion) of stakeholders, and institutions affect policy outcomes.
- Gender issues, assessing how women's views, interests and needs to shape the decisions that affect their lives as much as men's, in whatever cultural context they live.
- The psychological and health effects experienced by individuals and the social and cultural effects experienced by communities,
- The institutional and financial effects experienced by societies.

To make the assessments, SA uses a range of tools:

- Qualitative data collection tools (focus groups, semi-structured key informant interviews, ethnographic field research, stakeholder workshops
- Surveys that capture direct impacts and behavioural responses to reform, or specific dimensions (e.g. time-use patterns) that affect reform outcomes
- National survey data or statistics. While it may sometimes be necessary to rely on qualitative descriptions, quantitative information should be provided where

feasible. Change and predicted effects can be assessed in terms of levels of risk, altered amenity value, community identity and cohesion, etc.

Lessons learned

- SA should inform and improve the quality of decision-making.
- SA also has as much value for managing social impacts and managing the discourse of project/policy development, as it has for anticipating and documenting impacts. Although often seen as part of Environmental Assessment, it may be better carried out separately from the main environmental studies, since specialist skills in social sciences may be needed, and the timescales and study areas of the physical and social analyses may be very different.
- SA should focus on the ways in which people are affected rather than on technical and.

Economic impact assessment of proposed projects

There are two types of economic assessment: cost-effectiveness analysis (CEA) and cost-benefit analysis (CBA). CEA aims to select the cheapest (most cost-effective) method of attaining given objectives, while CBA selects the project with the highest excess of benefits over costs. Economic assessment techniques take account of all costs and benefits on a year-by-year basis over the life of the project, discounting future cash flows at an appropriate rate. Depending on type, results are expressed as: discounted cost per unit (e.g. of water saved or of treated effluent); Net Present Value (of the surplus of benefits over costs at a specified discount rate); or Internal Rate of Return (discount rate at which benefits and costs are equalised). Financial and economic values are usually differentiated (e.g. taxes and subsidies would be disregarded for economic analysis); a more refined model includes environmental costs and benefits.

Economic assessment can be linked with participatory approaches and demand assessment, and can focus on women's issues and broader health/livelihood effects of water use. Good economic assessment that reinforces IWRM demands a clear understanding of the direct and indirect impacts of proposed projects. It is a tool that identifies external impacts and equity (i.e. who pays and who reaps the benefits) as well as efficiency. Economic assessment tools can be highly effective in changing the culture of water managers and increasing public awareness of IWRM. As such they may be termed social change agents.

Lessons learned

When used seriously and consistently, economic assessment of proposed projects can provide an objective way of choosing the best water projects. But it can also be used cynically, e.g. to satisfy external funders, or to window-dress a pre-chosen project. Other problems include:

- The "technocratic" nature of CBA or CEA, and the use of a single number or single criterion to choose among complex projects
- Technical disagreement among practitioners (e.g. on which discount rate to use, on defining the "without case scenario", or the inclusion of environmental costs and benefits).
- Its use is not compulsory and its findings are not upheld by any legal requirements (in contrast with environmental impact assessment).

The following are preconditions for the usefulness of economic assessment:

- Politicians and senior administrators are committed to its serious use in selecting public investments
- An suitable guidance manual is available for sector professionals, responsible officials and consultants employed
- The policy context is conducive to the selection and successful operation of projects
- A range of options exists, sufficiently different to give a real choice and are compared consistently. Assumptions and the 'without project scenario' should be realistic, to avoid casting the project in an artificially favourable light
- Spurious accuracy is avoided; 'It is better to be approximately right than precisely wrong'.

>>> SEE SESSION PLAN 8.1: IMPACT ASSESSMENT

8.2 Environmental flows assessment

Material in this section is drawn largely from the UNEP-DHI Centre's materials on ecosystem requirements for water resources management and the GWP IWRM Toolbox.

An important aspect of assessment is the so-called "environmental flows" approach i.e. the water flow (including the appropriate variability regime) and water quality needed to ensure an ecosystem's health in accordance with the set of socio-political targets for the systems. Addressing the environmental flow issue is an important component in state-of-the-art management of aquatic ecosystems.

However, within the wider concept of environmental assessment, it is necessary to consider more than just water quantity and quality. Land issues like the characteristics of the upland catchments and floodplain morphology (including river beds and artificial levees and weirs) are also important parameters in the "Water for Nature" approach of IWRM.

What are environmental flows? One definition is: "Environmental flows are flow regimes provided within a river, wetland or coastal zone to maintain ecosystems and their benefits to people" Adapted from IUCN, 2003. What is a flow regime? It is the range of flows in a river as shown in a river's hydrograph:

Both low flows and large flows are important. Three dimensions should be recognised.

1. Low flows:

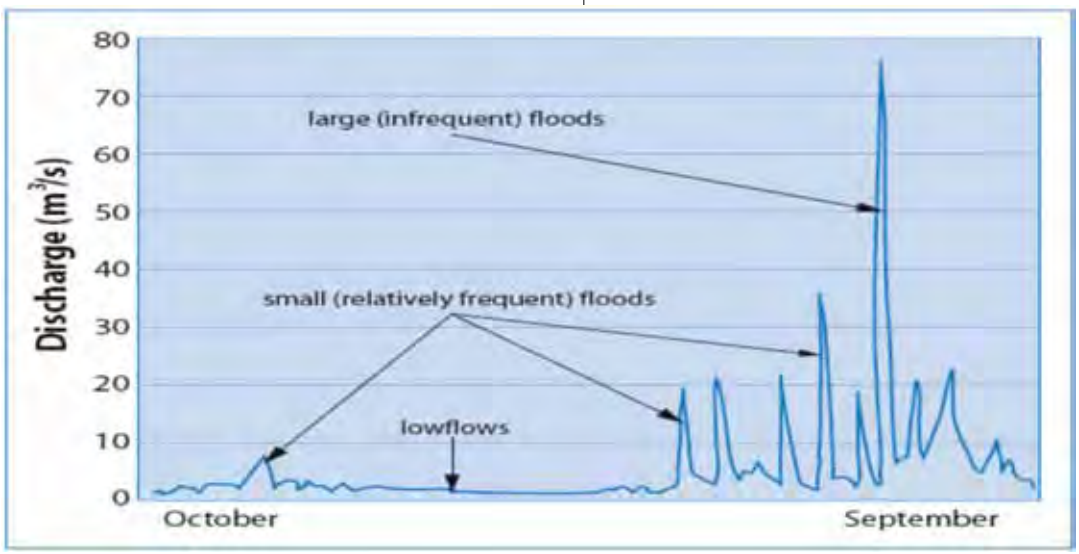
- Define basic seasonality of rivers
- Create prevailing 'background' hydraulic conditions
- Water depth, water velocity, wetted perimeter
- Create prevailing 'background' chemical conditions
- Directly influence the habitat availability and thus balance of species in any season

2. Small floods:

- Stimulate spawning in fish
- Cue for fish migration
- "Re-set" of river conditions
- Flush out poor quality water
- Cue for germination of riparian seedlings
- Sort river bed material
- Recharge soil moisture in banks

3. Large floods:

- Dictate the channel form
- Move and cleanse cobbles/boulders in riverbed
- Deposit silt, nutrients, eggs and seeds on floodplains
- Inundate backwater areas
- Recharge groundwater in floodplains



- Scour estuaries thereby maintaining the link with the sea

How are environmental lows assessed? Several types of environmental flow assessments exist and are summarised in the box below:

Methods used to estimate environmental water requirements

Source: Page 18 of Schofield et al, 2003 Environmental water allocation: principles, policies and practices. Land and Water Australia.

Hydrology-based approaches usually rely on the use of historical hydrological data, and are often referred to as fixed percentage or standard-setting methodologies. They assume that the provision of some proportion of the natural flow regime will maintain sufficient of the required hydraulic habitats, and therefore the fishery or other desired ecological feature. They frequently attempt to define a 'minimum flow'. Expert judgment is often incorporated to increase the quality of the assessment.

Hydraulic rating methodologies use rated river cross-sections to measure changes in hydraulic parameters such as depth or wetted perimeter with changing flow, and relate these changes to increased or decreased habitat availability.

Habitat simulation methodologies use multiple cross-sections to model habitat changes, usually in terms of depth, velocity and substratum types, and may be linked to habitat preference measures for selected biota. Holistic methodologies are designed to evaluate ecosystem requirements, in contrast to most of the environmental-flow-assessment methodologies described above which aim to assess the flow requirements of individual species or ecological components.

Holistic methodologies employ groups of specialists from different disciplines (e.g. fish, invertebrate and riparian vegetation biologists, social scientists, geomorphologists and hydrologists) and the final assessment is a consensus view of the flows that are needed to meet the requirements of a variety of critical species and components.

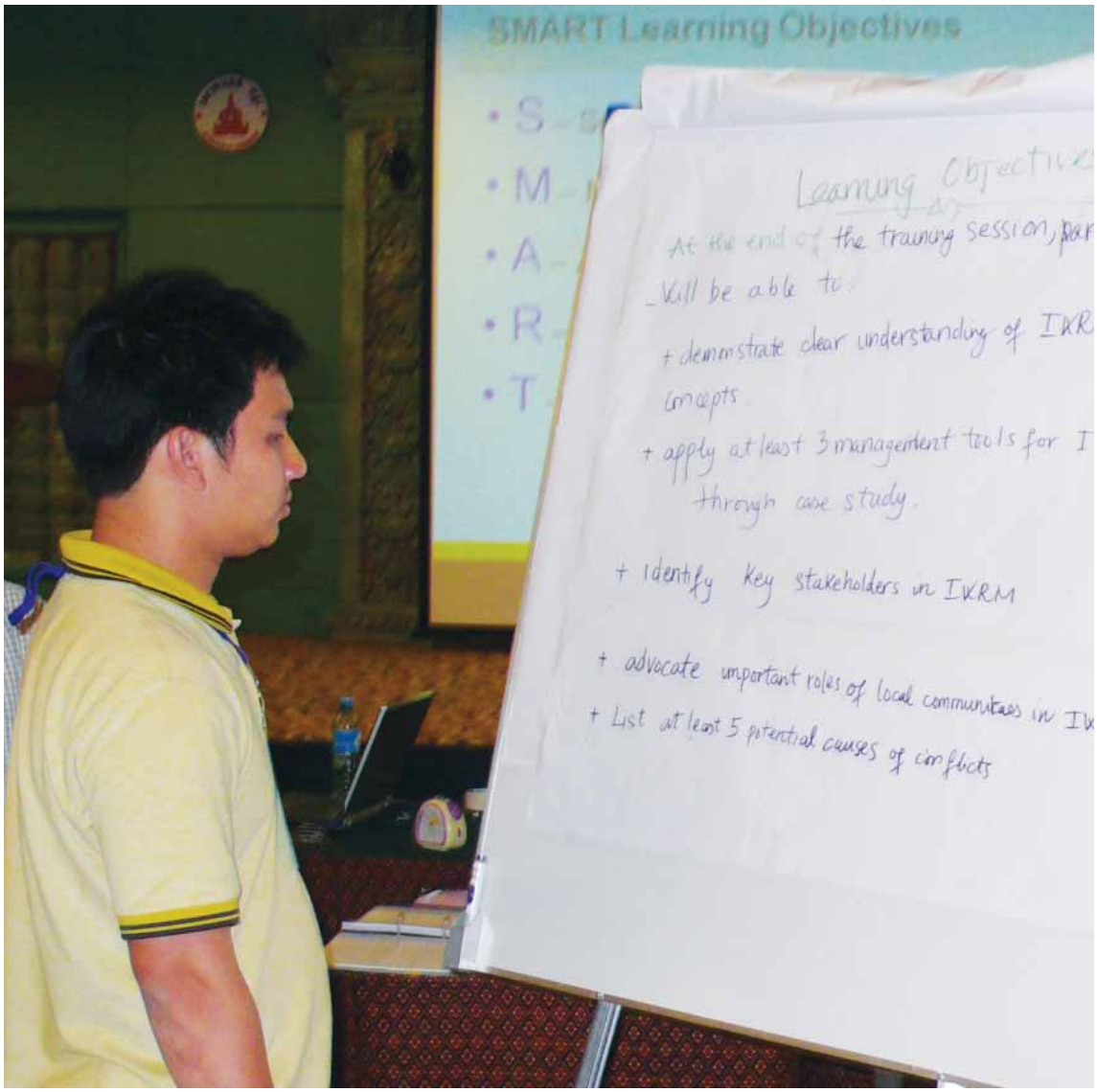
Mekong River Commission – Procedures for the Maintenance of Flow on the Mainstream (PMFM)

The intent of the 1995 Mekong Agreement is to promote cooperation among the riparian countries on the sustainable development and management of the Mekong water and related resources. The intent of the Procedures for Maintenance of Flow on the Mainstream (PMFM) under the provisions of Article 6 and 26 of the 1995 Mekong Agreement is to cooperate on the maintenance of an acceptable hydrological flow regime on the mainstream to optimize the multiple uses and mutual benefits of all riparian countries and to minimize the harmful effects (Article 1).

The PMFM Technical Guidelines provide flow thresholds for long-term planning and for real-time monitoring purposes at 11 hydrological stations along the mainstream. The flow thresholds provide an opportunity for the riparian countries to utilize considerable quantities of water of the Mekong without compromising its natural flow regime.

For long-term planning purposes, the potential impacts of development plans or proposed development projects will be assessed using the simulation models of MRC's Decision Support System (DSF). Plans or projects are usually grouped within 'Scenarios', with the plans or proposed projects added to the existing water demands and infrastructure. For each scenario, the DSF models provide simulated time-series of water flows at each of the selected hydrological stations on the mainstream. Subsequently, the scenarios will be evaluated with respect to the agreed flow thresholds. A scenario or proposed development project would not be deemed acceptable if the simulated flow transgresses the agreed flow thresholds at one or more of the selected hydrological stations.

For real-time monitoring purposes, the agreed flow thresholds provide confidence that the PMFM is being implemented and natural flows are being maintained at the key points along the mainstream for meeting important economic, social and environmental needs. When the daily monitoring shows that specific thresholds would be transgressed, investigations will be initiated to identify the cause(s), possible response(s) and mitigation measures.


SMART Learning Objectives
Learning Objectives
At the end of the training session, par
_Will be able to:
+ demonstrate clear understanding of IWR
concepts
+ apply at least 3 management tools for I
through case study.
+ Identify key stakeholders in IWRM
+ advocate important roles of local communities in IW
+ List at least 5 potential causes of conflicts

Case Study

Environmental flows in the Songkhram River Basin, Thailand

Characteristics

The Nam Songkram Basin covers an area of 13,128 km2 and is the second largest basin in Thailand's Northeast region. The Nam Songkhram River flows c. 495 kms to enter the Mekong River in Tha Utaen District of Nakhon Phanom Province. A defining feature of the Lower Songkhram River Basin is that it experiences a widespread flood across its floodplain each rainy season for two to four months duration that is closely connected to the hydrology of the Mekong mainstream.

An environmental flows assessment was carried out in the Nam Songkhram Basin in 2007. This was the first time this approach had been explored in Thailand. The interdisciplinary Environmental Flows work in the Nam Songkhram River Basin was a preliminary step towards providing data and practical tools for river basin and water managers at national, regional and local levels to apply similar approaches for better outcomes.

The E-Flows approach in the Nam Songkhram River Basin combined two core elements:

- A step-wise dialogue and consultation process with key actors and stakeholders within the basin and at a national level before and after the collection of empirical data
- An Intermediate Environmental Flows Assessment exercise that collected field data across a range of disciplines at the height of the wet season flows and lowest flow period of the dry season. This field exercise helped to inform and guide subsequent discussions with a range of basin stakeholders.

Lessons Learned

The work of the Nam Songkhram Basin E-Flows study continually stressed the inter-disciplinary linkages at the core of the process and underpinned the effort.

An increased knowledge and understanding of the river floodplain system and how hydrological flows affect it, is a key output of the E-Flows process. An unexpected output was the realization that there are several other analogous "flows" occurring on and around the floodplain, beyond the watery flows that were the primary object of the team's attention.

The study confirmed and strengthened the understanding of the close relationship between the mainstream Mekong River and the Lower Nam Songkhram River Basin (LSRB), in terms of ecology and hydrology, in particular the role of flooding arising from a notable backwater and occasional backflow effect on to the LSRB floodplain.

Because of the primary influence of the Mekong mainstream on LSRB flood timing, duration and extent, any attempt to control flooding by building flow control infrastructure on the Lower Nam Songkhram River or main tributaries like the Nam Oon, is likely to be futile and counterproductive, creating new and undesirable environmental impacts, which so far have not been taken into account in project proposals.

>>> SEE SESSION PLAN 8.2: ENVIRONMENTAL FLOWS

8.3 Risk assessment and management

Following environment, social and economic assessments of a proposed development, there is the need to undertake risk assessment of the project and options within the project. Risk assessments are needed to:

- Analyse the nature and distribution of potential harms from water management projects (e.g. dam building), policies and practices. Potential harms include not only the physical effects on interdependent water resources, related ecosystems and other waste receiving media, but also any detrimental socio-economic impacts. This more holistic risk assessment is critical for IWRM.
- Inform decisions on appropriate response levels and mitigation strategies to deal with water related natural and human induced hazards (resource scarcity, water quality, non-average climatic events, public health, ecosystems change).
- Evaluate the risks faced by water service providers and regulatory agencies in undertaking their functions (design and construction, operating failures, market, financial political and legal risks, compliance risks).

Conventional risk assessments link qualitatively the probability and magnitude of a hazard event with the costs of consequences (expressed in monetary terms) if the event actually occurs. These can then be incorporated into an economic assessment to aid decision-making. However, it is increasingly recognised that risk is a cultural concept and that risk assessment has to include evaluations of public perceptions of dread of the risk and of public priorities for harm reduction. There are now models in which the assessment starts with human needs and preferences, and then consider alternative courses of action available to address these needs within the financial and human capital constraints that always exist.

Risk management ideally needs to address five key questions:

1. What principles should govern risk mitigation decisions? (E.g. a precautionary approach, uniform safety standards or subsidiarily principles, should decisions on risk bearing and mitigation be made by private individuals or communities or professional experts, who should pay for risk mitigation?)
2. What is the appropriate scale and strictness of regulation? These should depend on the nature of the hazard and the socio-economic characteristics of the related risks.
3. What is the appropriate mitigation strategy? The option range includes complete hazard avoidance, structural measures, soft hazard reduction measures (e.g. catchment management), vulnerability reductions, risk pooling, loss bearing or sharing and post-event harm alleviation.
4. What are the appropriate policy tools? These include direct government provision of safety, regulations, economic incentive, land use planning, information provision, community participation and action.
5. What organisations need to be in place? e.g. stakeholder fora, coordination mechanisms as well as hazard regulators and safety providers.

Lessons learned

- Sectoral and segmented risk assessments can create major inefficiencies and inequities in the allocation of risk, mitigation costs and benefits of increased security.
- Risk needs to be seen as a social as well as physical issue. Stakeholder preferences must play a role in establishing risk mitigation priorities and practices (although these are not necessarily 'rational' or well informed).
- Risk mitigation has to be viewed as an economic good; safety is not a free good as it inflates demand and creates a dependency culture.
- Decisions about which hazards to address (and how and where) have distribution equity implications and thus need to be treated with political sensitivity.

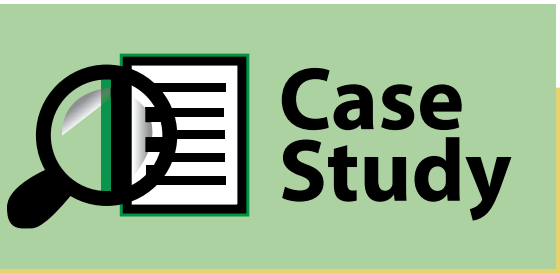
- Designing institutions which can take a holistic and demand driven approach to risk is a complex and difficult task.
- Risk reduction is not the same as hazard reduction; risk mitigation has to consider the reduction of vulnerability and methods to make loss/harm bearing easier (e.g. insurance).

>>> SEE SESSION PLAN 8.3: RISK ASSESSMENT

8.4 Procedures for notification and prior consultation and agreement

Proposed developments vary in size, impact and type. Significant discussion and debate should take place before deciding which projects are sufficiently significant to warrant notification and evaluation. This includes defining a project of significance in the Mekong system, where it occurs, who assesses its impacts (national governments, Mekong River Commission) The policy and institutional settings must also be taken into consideration: for example, whether a basin organisation exists; whether there are water rights; what are the organisational arrangements for water resources management.

The various funding agencies such as the World Bank, the Asian Development Bank, and the Organisation of American States (OAS) all have notification and evaluation requirements and procedures. These will vary slightly and are likely to be more comprehensive than what would apply to a river basin scenario. Nevertheless, they can provide some guidance to basin organisations.



The Mekong River Commission (MRC) PNPCA

The MRC requires all member-countries to advise or notify of particular projects under its Procedures for Notification and Prior Consultation and Agreement. (PNPCA).

Notification is applied for following proposed uses:

- Intra-basin use and inter-basin diversion on the tributaries; and
- Intra-basin use during wet season on the mainstream.

Notification is undertaken in accordance with a form/format agreed by member States and content of Notification includes a Feasibility Study, an Implementation Plan, a Schedule, and all available data relevant to the proposed use. **Prior Consultation** includes data and information required for **notification** plus available and additional technical data and information for other member riparians to evaluate the impact of the proposed use upon their uses of water and any other affects, which is the basis for arriving at an agreement. According to the PNPCA para. 5.3.1, the role of an NMC in Prior Consultation is to:

- inform relevant line agencies of the scope, contents and form of Prior Consultation of a proposed use covered by the Procedures
- receive, review and check documentation of any Prior Consultation for consistency and completeness
- assemble and transmit in a timely manner the proposal with appropriate documents to the MRC Secretariat for their submission to the MRC Joint Committee and transmission to other NMCs

- facilitate any consultations, presentations, evaluation and site visits as requested by the MR Joint Committee for the proposed use; and
- record and transmit copies to respective line agencies or parties making the proposal for a definite use of water through the Prior Consultation process of any comments or response received from the MRC Secretariat

The Scope of Prior Consultation refers to uses including:

- Inter-basin diversion from mainstream during wet season
- Intra-basin use on the mainstream during the dry season, and
- Inter-basin diversion of the surplus quantity of water during the dry season.

Regarding Specific Agreement for inter-basin diversion from mainstream during dry season. The country (ies) that has (have) the proposed inter-basin diversion shall notify the JC by a letter with attached documents and request the JC to initiate, on case-by-case basis, consultation process for leading to a specific agreement.

8.5 What factors need to be considered?

World Bank Guidelines for identifying projects of significance suggest that core critical factors need to be considered. Each river basin is different and a host of aspects need to be considered in establishing the procedures for notification and evaluation. Below is a list of some of the issues that should be considered for notification and evaluation.

It is important to establish the following:

- Whether the main river system and the tributary streams warrant the same attention
- The potential impacts of the project on riparians, including magnitude
- The main transboundary issues and whether they are related to water quantity or water quality
- The criteria for which a project is deemed insignificant and hence does not trigger notification (size; type - domestic, industrial, or agricultural; impact)
- Who can trigger the notification procedures – the proposer, the river basin organisation, a riparian, or all of the above
- The format, information, and time required for notification and for evaluation
- The criteria for extension
- The details for requesting additional information – who can request more information; whether this must be complied with
- The procedures for non-compliance with submission guidelines
- The role of the basin stakeholders – advisors or decision makers
- The role of the basin organisation – whether to participate in the evaluation or coordinate the evaluation process to be done by others; dispute resolution
- The information dissemination and consultation practices and the confidentiality levels – public hearings, closed technical reviews.
- The type of evaluation to be done based on set project criteria – technical, environmental, social, economic, and financial.

This is not a complete list of all the factors that need to be taken into account for project notification and evaluation, in particular with respect to the technical and legal issues.

Case Study

Main IWRM Issues at the Project Level (Mekong River Basin)

Description

In general, the hydropower locations in Lao PDR, Viet Nam and Cambodia, have been identified and assessed solely for the development of hydropower and therefore offer few opportunities for traditional multi-purpose operation for flood control and irrigation. Therefore, it is understandable that subsequent hydropower planning to a large extent considers the rivers as hydraulic systems to be operated for maximum hydropower generation with little consideration of other potential uses and the "healthy life of rivers".

The situation is amplified by the central and sector oriented development and management of hydropower projects, whereby planning is carried out by technical specialists with limited on-site knowledge of the present utilization of the river systems and limited understanding of the social, cultural and environmental values of the river systems to the local population.

The resulting single-purpose projects may be less economically beneficial and efficient than multi-purpose projects and they often increase the adverse effects downstream and upstream of the project.

Lessons learned

Identified examples of untapped potentials, which could increase the benefits from multi-purpose hydropower for the local population and especially those directly affected by the projects, are: reservoirs fisheries and aquaculture, cultivation of the reservoir bed, catchment management, pumped irrigation; water supply; and recreation and tourism. Often the above additions to the project have benefits too for the hydropower developers and operators. For example, improved upland watershed management reduces the sediment accumulation in the reservoir. The cost of upland watershed management should be considered part of the operation and maintenance cost of the infrastructure and internalized in the price of water or energy.

Hydropower projects on the Mekong tributaries are peaking projects that create wide and sudden variations in downstream flows, often to the distress of people living downstream. Usually it necessary to construct a low dam downstream of the main dam to reduce flow variations.

There is a need to increase the capacity of line agencies to work together to assess project proposals from a multi-purpose perspective, and learn to appreciate the potential benefits of multi-purpose projects at the national and local levels.

The water resources management agencies in Cambodia, Lao PDR and Viet Nam need to support the energy sector agencies to review and update sector plans and projects, which in the past were approved by governments, taking into account recent changes in the policy and legal framework.

Procedures for Project Notification in the Lower Mekong Basin

Description

The 1995 Mekong Agreement is not an allocation based agreement (percentage or fixed volume of flows or discharges), but rather a more flexible formula of enabling a minimum amount of interference through simple notification, to prior consultation where the likelihood of impacting the rights and interests of all riparians may arise, to the highest standard of a specific agreement where the proposed use will impact mainstream flows, but not necessarily interfere with the rights and interests of other riparians.

The Procedures for Notification, Prior Consultation and Agreement (PNPCA), were negotiated between the LMB countries with facilitation of the MRC and approved in 2003. The implementation guidelines were approved in 2005 and provide responsibilities to MRC bodies only. The Joint Committee (JC) over sees the implementation, the National Mekong Committees (NMCs) collaborate with the line agencies and submit the notifications to the MRC Secretariat (MRCS). MRCS reviews the notifications for completeness and transmits copies to all JC members for their review and comments. No duty or responsibility for technical review of the notifications has been delegated to the MRCS.

Implementation of the PNPCA began through the NMCs in contact with the relevant line agencies in each country. To date, records of the MRCS indicate a total of 24 projects are covered by the 17 notifications submitted. To date, there have been no submissions for prior consultations or specific agreements. So far the intended impact of the PNPCA has been limited. Notifications mostly reached the MRCS at the very end of the project preparation cycle and no annual reports on the PNPCA implementation status and effectiveness have been submitted to or considered by the JC.

Lessons learned

1. The line agencies need to become much more involved in the implementation of the PNPCA. It is, after all, the responsibility of the line agencies, and in particular the national water resource management agencies, to manage the water resources of their countries.

2. The PNPCA needs to be complemented by an "IWRM-based Basin Development Strategy", against which country plans and project proposals can be considered. This will create confidence that water can be allocated and used without unforeseen impacts. This should lead to proposals being notified much earlier in the process. This in turn will need evaluations to be timely and comprehensive. The timely and transparent processing of the notifications by the MRC will make it easier at the national level to attract funding for projects, since project developers are provided some certainty as to the water resources management processes against which proposals will be judged.

3. There is a need for joint learning and sharing of views in an informal setting to complement the formal negotiation and drafting meetings, in order for all participants to fully understand and appreciate the topic under consideration and bring out their particular knowledge on the subject for innovative discussions. This will enhance the implementation of the PNPCA.

Focus Point

General provisions of what information is typically included in a Notification and Evaluation Protocol

Chapter 1. General Provisions
- Purpose
- Role and responsibilities
  - Basin organisation
  - Member-state/province
- Area of application of these procedures
- General obligations to comply
- Obligations to consult with stakeholders and civil society

Chapter 2. Project Notification
- Obligation to notify of a "specified" project
- Format and timing of notification
- Type of projects
- Basin organisation to advise all members of any notified proposal

Chapter 3. Project Evaluation
- Procedures for the basin organisation to follow in:
  - Collating information
  - Making technical assessments: undertaking impact assessments of proposed projects (environmental, social and economic assessments) and risk analyses
  - Determining time necessary for evaluation
- Specification of the policies, guidelines, goals, and targets against which the project will be evaluated
- Advice of results of evaluation for:
  - Acceptable proposals
  - Unacceptable proposals
- Advice to stakeholder groups
- Appeal processes if the proposal is not acceptable
  - Basin partners
  - Stakeholders

Chapter 4. Request for Information
- Additional information relating to a notification
- Information for a proposal that has not been submitted for review
- Appeal against decision to request:
  - Further information
  - Notification of a new proposal

Chapter 5. Disputes, Penalties, and Interpretation
- Dispute process
- Penalties and sanctions for refusal to comply
- Interpretation of schedule

8.6 Key questions

- Is one of the roles of the basin organisation or relevant water resources agency to evaluate the basin-wide impact of new development proposals?
- If not, how can these evaluations be undertaken so that all administrations within the basin (states, provinces, counties) are confident that their interests are being considered?
- If notification and evaluation of particular projects has been mandated, does the legislation, legal agreement, or set of regulations provide clear powers for the basin organisation to undertake the evaluation work?
- Should specific schedules to the basin agreement be prepared, agreed, and attached to the basin agreement to detail the role and functions for notification and evaluation?
- Has it been specified how stakeholders and civil society are to be involved, what are their participation and objection rights, and what procedures should be followed?

Source: Integrated River Basins Management: From Concepts to Good Practice. Briefing Note 9: Notification and Evaluation of Projects of Basin-wide Significance. World Bank.

>> **SEE SESSION PLAN 8.4: ROLE PLAY – BRINGING IT TOGETHER – PROJECT NOTIFICATION AND EVALUATION, ENVIRONMENTAL FLOWS, STAKEHOLDER INVOLVEMENT AND IMPACT ASSESSMENT**

Relevant material in other resources

Resource	Section
The Global Water Partnership (GWP) and the International Network of Basin Organizations (INBO) for use of: *A Handbook for Integrated Water Resources Management in Basins.*	Chapter 7
UNESCO IHP/WWAP/NARBO for use of: IWRM Guidelines at River Basin Level.	3.2.1 Assessment

Session Plan

8.7 Session Plan 8.1: impact assessment

OBJECTIVES

At the end of this session the participants will be able to:

- Understand what the concept of impact assessment is and to list some examples from the Mekong Basin
- Identify impacts from a case study and ways in which to assess them

MATERIALS

- Flip charts
- Marker pens
- Coloured cards
- Case Study description
- Mekong map
- Copy of the IWRM Planning Cycle

TIME

- 90 minutes

PREPARATION

- This session requires that participants read the case study in advance and work together in multi-country groups. Participants will need to talk through issues and impacts and determine assessment techniques before making a decision on a project

STEPS

15 min:

- Introduce the session on impact assessment.
- In plenary, ask the participants what "impact" means? Write the definitions on coloured cards and talk through each one. There will be multiple definitions of impacts.
- In plenary, ask the participants what "assessment" means and why assess impacts in water resources management. Write definitions on coloured cards and talk through each one.
- Have a discussion on the use of the impact and assessment concepts.

45 min:

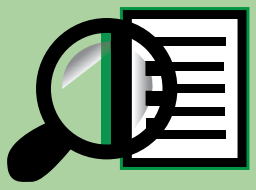
- Break into small groups of 4.
- Ask participants to read a short case study (if not provided the day before) on a hypothetical situation. Review the details of the case study if needed. This can be done by explaining the key points.
- Groups should discuss the study together and agree jointly on the findings.
- In small groups, participants will need to answer the following questions:
    - What are the likely impacts from the proposed project? Provide both a list of both positive and negative impacts in the areas of environmental, social and economic.
    - How would you assess these impacts?
    - Would you recommend this project for approval? If not, what would you recommend needs to be improved (e.g. further studies? Change in design?)

15 min:

- In plenary, ask each group to present their impact assessment findings, their decision about the project and reason for that decision.
- After each group presents, ask for questions or comments.
- Discuss any difficulties that the groups may have identified in identifying or assessing impacts.

15 min:

- Close the session by identifying on a map of the Mekong places where impact assessments have occurred. Remind participants of the numerous different types of impact assessments being carried out in the Mekong. That many of these assessments are being carried out by different actors in an uncoordinated manner. Finally, explain the importance of doing impact assessments and when they are carried out within the IWRM planning cycle.



Case Study

Lion Refuelling Co. Ltd.

You work for the Ministry of Water Resources in your country. The World Bank is developing a new project and the Ministry has asked you to assess the project's environmental, social and economic impacts (both positive and negative).

Read through the case below and working in your group answer the questions and decide whether this project should be approved.

The Lion Refuelling Co. Ltd. (LRC) is a joint venture between Thai, Chinese and Lao companies. The partners anticipate an increase in commercial shipping on the Mekong River (between China and Thailand) and wish to establish a refuelling station upstream of Huay Xay, Lao PDR in a small fishing village, which is critical habitat for the Mekong giant catfish. It is expected that other important fishing areas would be impacted and the Mekong Kai (seaweed) would be lost.

The companies chose this location because they were able to obtain a good lease on the riverfront at a reasonable rate. Furthermore, this stretch of riverfront (along the Mekong) is suitable for construction of a landing for large boats. The site is easily accessible from Chaing Rai on the Thai side and the village of Huay Xay on the Lao side. However, the planned development is just downstream of serious bank erosion on the Lao side and a major port (Chiang Saen) on the Thai side.

In Phase 1 of the project LRC will construct a 50 m landing for refuelling boats. Fuel will be piped to the landing. This pipe will contain shut off valves every 50 m to minimize leakage in the event of a rupture in the pipe. The latest safety equipment will be used in the pumping and storage facilities. This will be the first refuelling station on the Mekong.

A housing compound for 10 full time staff will be constructed 100 m from the riverfront. The housing compound will contain five duplex housing units, a small recreation hall and restaurant. Just above the landing, LRC will construct a row of twenty 4x5 market stalls for rent to traders. LRC will also build a small clinic and pay for a full time doctor. Significant forest will need to be cleared to build the housing and market stalls.

Water for the housing compound, market stalls, clinic and landing facility will be pumped from the Mekong River and treated in a small treatment plant. Currently local communities are drinking water directly from the Mekong River.

During Phase 1, fuel will be shipped to the site in tankers and pumped from the landing to the storage facility. A single lane, all weather road will be constructed from the site to Huay Xay and link to Road Number 3 in Lao PDR. Land will be cleared and some villages will be relocated to make way for the road.

Procurement of materials and supplies will benefit Chinese, Lao and Thai companies. LRC expects to employ up to 100 people during the construction phase of the project. Many Chinese will be involved in the construction phase. The company will employ ten full time people at the site and provide part-time and occasional employment for nearby villagers.

LRC is committed to sustainable development. Before they begin construction on the site, an environmental impact assessment needs to be developed.

We would like you to review the information in the case study and advise on any measures the company could take to minimize environmental, social and economic impacts and maximize the benefits to local people.

Questions for group discussion:

- What are the likely impacts from the proposed project? Provide both a list of positive and negative impacts in the areas of environmental, social and economic.
- How would you assess these impacts?
- Would you recommend this project for approval? If not, what would you recommend needs to be improved (e.g. further studies? Change in design?)

Session Plan

8.8 Session Plan 8.2: environmental flows

OBJECTIVES

- To introduce trainers to principles of environmental flows assessment and its use in IWRM.

MATERIALS

- Paper, pens

TIME

- 60 minutes

PREPARATION

- Flip chart to record answers

STEPS

Work in groups of 2-4 and:

- Prepare a first list: what are important ecosystem services supported by environmental flows in your basin
- Prepare second list: what are the trade offs between water used in a reservoir and water released for environmental flows
- What will be your advice to the Minister of Water Resources in your country?
- What will be your advice to the Mekong River Commission?
- What will be your advice to fishermen who use the river as their food source?
- Prepare an outline (just subheadings) of environmental allocation strategy within an overall IWRM basin plan or strategy for a specified location. Three key understandings for a case study can be developed:
    1. How altered flow regimes affect riverine health and how to achieve optimal riverine health in significantly altered flow regimes
    2. The specific socio-economic issue of property rights
    3. Justice issues of people being denied access to river flows

Report back to the whole class with your observations

Session Plan

8.9 Session Plan 8.3: risk assessment

OBJECTIVES

At the end of the session participants will be able to:

- Use a very simple risk management planning tool to assess the social, environmental and economic risks associated with any planned water management intervention.

MATERIALS

- Flip charts
- Marker pens
- Glue or sticking tape
- Index cards

TIME

- 1 hour and 30 minutes

PREPARATION

- Outline the steps of the exercise on a flip chart (see Step 2).
- Draw a risk management matrix on a flip chart (see Session Support Material - 1)
- List possible risk management strategies on a flip chart (see Session Support Material – 2)

STEPS

1. Introduce the session by indicating that one of the key issues in developing long-term basin management strategic plans is to assess risks, such as those posed by floods, droughts or other natural disasters, and to devise measures to stop or reduce these risks. For example, it is becoming increasingly important to plan for the risks posed by changes in climate.
2. Ask participants what are the economic, social and environmental risks associated with climate change for water resource management. Note down the responses on a flip chart or white board.
3. Break participants into small groups based on geographical localities so that each group can work on a common (and known) river system. The exercise will be much easier to complete if the participants have a specific location or example that they have good background knowledge of.
4. Outline the exercise to participants indicating that 4 steps will be taken to explore the potential social, economic and environmental risks from climate change to IWRM:
   - **Step 1:** Ask participants to brainstorm all the possible risks associated with climate change that will influence IWRM in their particular river system. Each identified risk needs to be written onto one index card and each group is to consider social, environmental and economic risks.
   - **Step 2:** Each group is then to identify what they consider to be the three most important risks for the social, environmental and economic groups.
   - **Step 3:** For each of the three most important risks, each group is to place them in one of the quadrants of the risk assessment matrix.
   - **Step 4:** Each group is to develop up a risk management strategy based on the assessment of each of the risks against livelihood and impact. When participants are considering strategies, refer them to the strategies outlined in the Session Support Material.
5. After introducing the exercise, seek questions or clarifications from participants. Allow 45 minutes for the exercise.
6. At the conclusion of the small group work, get each group to report on their outcomes.
7. Initiate a discussion around the following guiding questions:
   - What were some of the main risks that were identified that would negatively impact on IWRM in the region?
   - What groups of people would mainly be impacted by these risks and what strategies do you think they could employ to over come these risks?
   - What were some of the common strategies suggested to overcome the identified risks from climate change?

Session Support Material

Risk Assessment Matrix

Likelihood is the chance of an adverse or very poor outcome.
Impact is the scale if things don't go to plan or go wrong.

Session Support Material

Hard strategies - infrastructure and technology:

- Traditional water storage systems;
- Flood proofing;
- Storage management;
- Early warning systems;
- Integrated water systems and supply security;
- Water reuse and desalinisation.

Soft strategies – institutions, technologies and management systems:

- Demand management;
- Efficient technologies;
- Establishing a culture of conservation;
- Managing water scarcity through trade;
- Land use planning;
- Education and communications.

Session Plan

8.10 Session Plan 8.4: role play – bringing it together

OBJECTIVES

Many water resources management issues require practitioners to deal with complex situations in which they use several IWRM tools simultaneously. The objective of this session is to role play a hypothetical case and for the participants to appreciate the importance of:

- Notification
- Environmental flows assessment
- Stakeholder involvement
- Impact assessment

Note: This session is best done once all the materials in the above four topics have been covered in class and does not need to occur in the presentation of material in this chapter. It can be presented at the very beginning or at the end of the overall training session.

MATERIALS

- Print outs of the following 'Big Hydro' case material

TIME

- 60-90 minutes

PREPARATION

- Printout of the 'Big Hydro' case material

STEPS

1. **Distribute** the 'Big Hydro' material the day before and request it be read prior to the session
2. **Allow 2-3 minutes** for participants to identify the stakeholder they wish to role play
3. **Select a 'river manager'** – s/he will be the final decision-maker who decides water allocations including environmental flows
4. **Request** the role players work out their bargaining position - allow at least 20 minutes for this. The participants need to identify what is there bargain starting point as well as what they will compromise to in order to achieve a final equitable solution? Ensure the role players can state these positions clearly
5. **Role players then present their bargaining positions** to the 'river manager'
6. **Bring in the 'river manager'** – get him/her to provide a final decision, including reasons why this decision was made
7. **Discuss together in class:** What is the final solution? Has everyone won? Are there winners and losers? Are all benefits shared equitably?
   - Under the MRC PNPCA, discuss if this role play example does or does not quality for action.
   - If the role play example qualifies for action under PNPCA, what are the first two or three steps (use the Focus Point on page 146) that you would undertake under:

     o Notification, and / or

     o Prior Consultation

COMMENTS

- This is a complex but perhaps realistic water resources management issue. Care is needed to allow time for participants to discuss the issues for a considerable time before they adopt role playing positions. Allow at least 30 minutes to discuss the material.

Role Play: The Legend of 'Big Hydro' - An IWRM role play on the impacts of dams, water reform and environmental flows on livelihoods

The White Mountains Hydro-Electric Scheme is a cooperative scheme shared by three provincial governments in Somewhere Land that produces electricity and increases the security of water supply along the Yin-Yang River.

'**Big Hydro**' is a dam on the Y-Me River on the other side of the drainage divide to the Yin-Yang River. It provides water by pumping from Y-Me River over the drainage divide into the Yin-Yang basin for downstream irrigated agriculture. There are about **75,000 paddy farmers** using this diverted water. They have a **secure water supply** and are improving their farm incomes. Life has never been better for the farmers of Yin-Yang Rivers. They are model farmers to the rest of Somewhere Land. Many have won best practice awards for farm improvements.

Big Hydro was completed in 1967. Since then flows have dropped below the dam wall to **1% of annual natural flow**. The environmental impacts of damming Y-Me River have been substantial and include:

- Significant reduction in the size of the river channel and changes in the channel geomorphology from a continually flowing river to a chain of pools
- Channel infestation with nasty weeds
- Invasion of a salt wedge at the river mouth where it enters the Great Big Sea, with a decline in coastal tourism
- Reduction in breeding waterholes, and subsequently declining fish populations which are used by over 25,000 local fishermen
- Declining fish populations due to altered fish barriers created by changed flows – the fish barriers and piles of sediment in the river caused by low flows – the pools behind the barriers also fill with human waste
- Significant loss of a rare and endangered water bird, the Long Neck Crane found only in River Y and which used to breed in a Ramsar wetland on River Y
- Loss of species habitat (e.g. fish and bird populations have severely declined on the flood plains next to the river – these don't flood any more)

- A significant increase in water temperature harming in stream biota (animals) and water quality
- Prolific sedimentation and macro-algae matting
- Loss of a regular snowmelt fresh water supply to the indigenous people, most of whom are fisherman and have lived here for over 1000 years
- Lost recharge capacity to shallow aquifers on the lower catchment floodplains, and subsequently negative impacts on agriculture - over 100,000 paddy farmers are losing their ability to irrigate from groundwater supplies).

The good news is that there is a lot of water reform in Somewhere Land. The provincial governments have implemented water reform as directed by national government. They have begun partially privatising the water sector as

part of a move to efficiency - a key IWRM goal. This involves corporatizing hydro-electricity production by creating new water companies which are partially government owned. 'Big Hydro' now makes money and doesn't cost taxpayers anything. Many politicians in the Big Hydro area are happy because of this.

In 2009, the three provincial governments who share the Y-Me River basin agreed to **21% of annual natural flow being financially facilitated and secured for return within 10 years of corporatisation of the hydro scheme**, with an **additional 7%** of returned annual flow to be made available later, subject to private investment. So far, this has worked. The government bureaucrats are pleased and taxpayers no longer have to pay for 'Big Hydro' (as it sells its water and electricity and makes money). Consequently, the price of electricity has gone up for pumping water by Y-Me paddy farmers who use groundwater which was once recharged by Y-Me River.

For the 10-year period during which **21% of annual natural flow will be reinstated**, two of the provincial governments have committed $150 million to source the required 214 GL (gigalitres), predominantly through water efficiencies. It is anticipated that a **joint government enterprise** will be established to oversee expenditure of these funds and the reclamation of water for the Y-Me.

Looking to the future, the availability of three years of extensive, pre-environmental flow, riverine health data provides an excellent foundation for broad **research** - assessing the effects of environmental flows on channel, fish, water - quality and weed management. Many professors see this as a great opportunity to become environmental flow experts.

But ..... will water-dependent livelihoods be sustainable for Y-Me River residents?

What is Role Play?
In a role play, participants take on the role of different actors in a water resources management issue. Role plays can be used to act out their beliefs and 'bargaining positions' in a water stakeholder conflict.

Role play is a useful device for trainers.

It stimulates trainees to:

- Understand what a stakeholder is
- Learn stakeholders' positions/opinions on an issue
- Appreciate other's point of view
- Understand the complexity of water resources management issues
- Show how IWRM provides a solution through bargaining to achieve a coordinated solution

Let's role play!

- Become a stakeholder. What is your bargaining position with the river manager?
- Who is the 'river manager' (decides water allocations including environmental flows)?
- What will you bargain to get an equitable solution? What will you do? What will you say?
- What is the final solution? Has everyone won? Are there winners and losers? Are all benefits shared equitably?

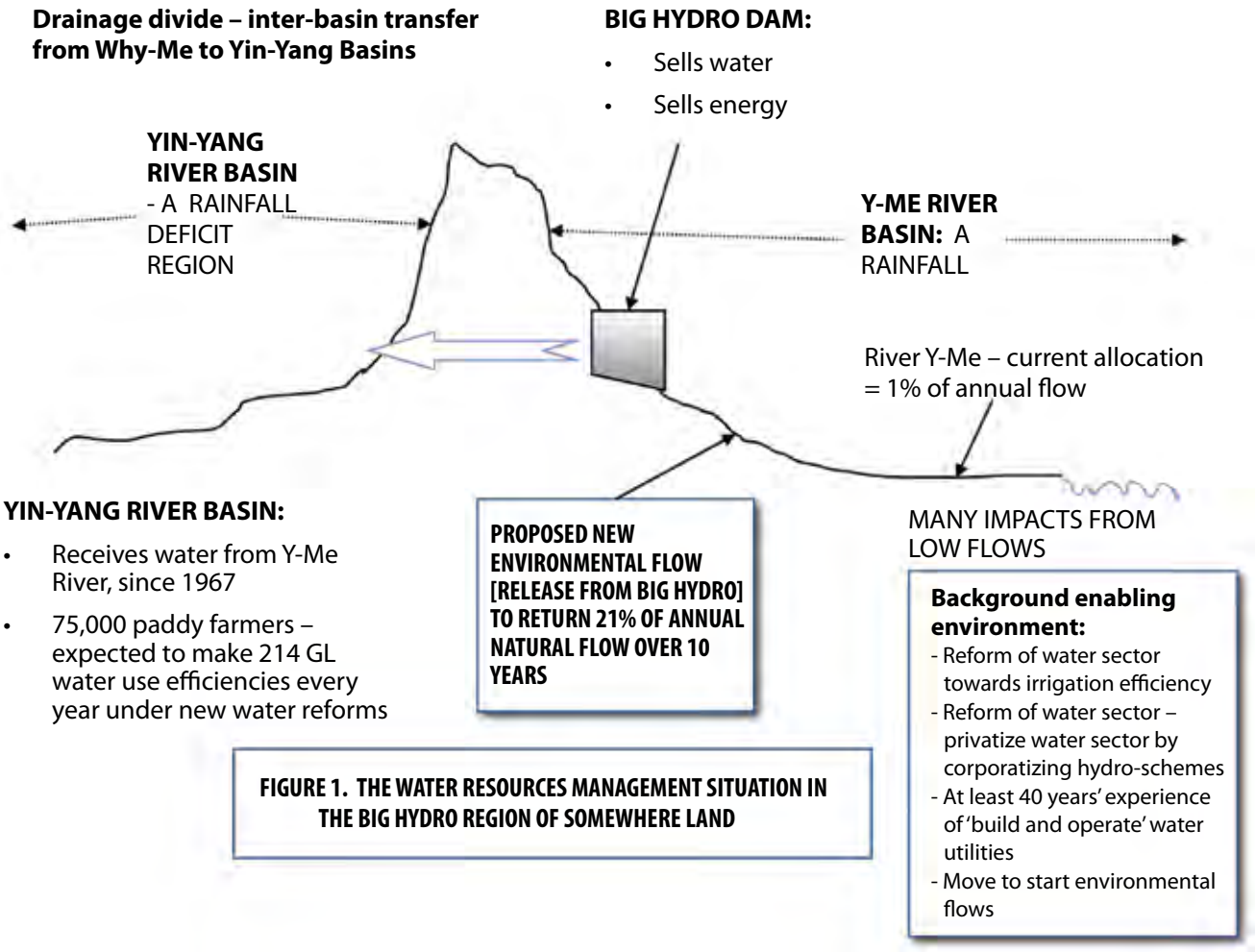


FIGURE 1. THE WATER RESOURCES MANAGEMENT SITUATION IN THE BIG HYDRO REGION OF SOMEWHERE LAND

Chapter 9
Basic Training Skills and Knowledge

9.1 Introducing training and learning

Introducing the principles of adult Learning

Adult learners will come to a training programme with a vast amount of previous knowledge and experience that they have gained throughout their lives – of which training will only be a small element of this learning process. In acknowledging this, consider:

- Adults decide for themselves what is important to learn. Give adults a say in the training agenda. Include a session on expectations.
- Adults draw from past experiences and like their learning to be focused on their own specific situations. Refer to those past experiences and encourage exchange among trainees by working in groups and by asking them to link things to their own working situations. Use reflection exercises and provide specific real-life, working examples.
- Adults question the truth or usefulness of information they receive. Before a session explain the need and usefulness of the session for the participants.
- Participation in learning for adults is voluntary. If they are convinced of the usefulness of material they are more motivated.
- A safe and open environment is needed and time should be spent on getting to know participants and build group norms.

Adults therefore learn best through a combination of methods that link their experiences to the testing of new knowledge and skills. Active participation session where this can happen is therefore very important.

Adults will therefore learn when it is:

- Self-directed: Adults can share responsibility for their own learning because they know their own needs
- Fills an immediate need: Motivation to learn is highest when it meets the immediate needs of the learner
- Participative: Participation in the learning is active not passive.
- Experiential: The most effective learning is from shared experience; learners learn from each other, and the trainer often learns from the learners.
- Reflective: Maximum learning from a particular experience occurs when a person takes the time to reflect back upon it, draw conclusions and derive principles for application to similar experiences in the future.
- Provides feedback: Effective learning requires feedback that is corrective but supportive.
- Shows respect for the learner: Mutual respect and trust between trainer and learner help the learning process.

Type of training method	Percentage of material recall	
	After 3 hours	After 3 Days
Verbal (one way lecture)	25%	10-20%
Written (Reading)	72%	10%
Visual and Verbal (illustrated lecture)	80%	65%
Participatory (role play, case study, practice, etc)	90%	70%

- Provides a safe atmosphere: A cheerful, relaxed person learns more easily than one who is fearful, embarrassed, nervous, or angry.
- Occurs in a comfortable environment: A person who is hungry, tired, cold, ill or otherwise physically uncomfortable cannot learn with maximum effectiveness.

By understanding and applying the above principles, the training can be tailored to be more effective for all learners.

Introducing problem based and experiential learning

Problem Based Learning

Problem based learning ensures that training matches real-life needs and allows learners to acquire skills in using essential information in decision making processes for the analysis and solutions of problems. Problem based learning builds upon adult learning principles and can serve as a core training approach as it stimulates learners to reason, think critically and consider differing scenarios of options.

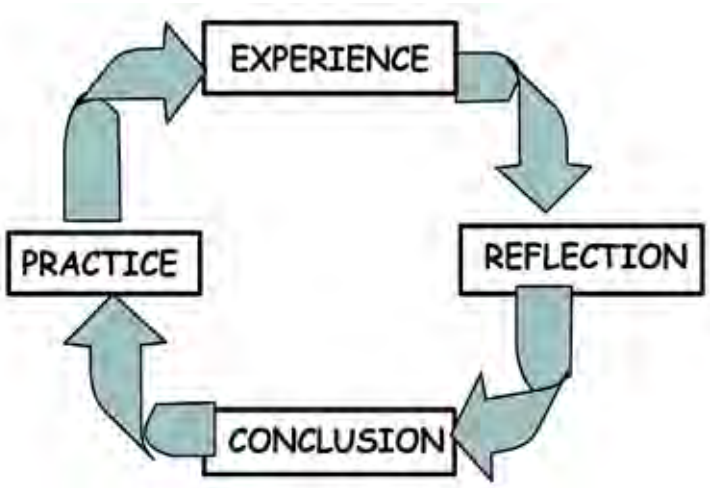
Experiential Learning

Tell me … I forget, show me … I remember, involve me … I understand.
Ancient Proverb

Building upon adult learning principles and problem based learning, 'experiential learning' is a four-stage cycle based on experiences (do it - experience), reflection (reflect and think about it), concepts and ideas (conclude - think about how to apply it), and active experimentation or practice (try it out - practice).

For a learner to be fully effective they need to move through all four stages.

Based on the experiential learning cycle four main learning styles have been identified:



Activist

- Learns best by doing using methods like
  - Group discussion
  - Projects
  - Role play
  - Simulation

Reflector

- Learns best in situation where can observer or reflector:
  - Brainstorm on own experiences
  - Reflecting on a simulation or role play

Pragmatist

- Learns best from specific examples and own involvement such as
  - Exercises

Theorist

- Learns best by self-study such as
  - Home work
  - Analysing case studies

Although everybody has an overall preferred learning style, the choice in a specific situation might be different depending on the task and the topic. However it is important to understand that learners will have different styles or preferences for learning and in every training

course the learners will represent a mixture of these different styles. The trainer therefore needs to develop training methods that emphasis all 4 learning styles or else the effectiveness of the training programme, for all learners, may be limited.

How to use this knowledge of learning styles and problem based learning during a training?

- Vary training approaches and methods to try and accommodate all learning styles;
- Try to design the same session using different approaches to encourage yourself to think more creatively;
- Try to walk through all 4 phases of the learning cycle for each new topic;
- Select various teaching methods that will be attractive to all learning styles; and
- Present learners with a realistic situation, problem or case and get learners to work in groups to:
    - Brainstorm the key issues based on their experiences (experience)
    - Generate a rich array of possible explanations or approach to solving the problem (reflect)
    - Critically consider each of the possible solutions through reasoning and prioritising (conclude)
    - Come to a conclusion through testing or seeking further information (practice)

9.2 Participatory training

Many of the principles of participatory training draw on theories of adult learning which stresses that adult learners need opportunities to think, to understand and to apply.

- To learn by thinking, trainees need to have responsibility to work out their own conclusions.
- To learn by understanding, trainees need to relate the learning experience to their own values, beliefs and previous experiences.
- To learn by applying, trainees need to use and test a new skill and receive feedback on their performance.

Learning is evidenced by change – changes in behaviour, knowledge, understanding, skills, interest, values, awareness or attitudes. To facilitate these changes, learning activities need to be selected specifically to encourage learners to engage with the material and become active and excited about the material – learners need to offer ideas, raise questions, build on one another's statements and challenge one another's opinion. Adult learners need to work with and learn from other participants.

During a participatory training programme, the trainers' job is to structure and facilitate rather than deliver information, explain or provide answers. Trainers initiate discussion and then draw in the trainees. They amplify some trainees' comments and summarise others'; they compare and connect separate remarks and point out opposing views. They draw the threads of discussion together and relate them to the workshop's objectives. Participatory training approaches emphasise the process of inquiry, and therefore participatory training approaches often end with questions as well as conclusions.

Traditional Teaching

- Teacher's role is to tell students what they need to know
- Teacher is more knowledgeable and experienced than students
- Teacher shares his/her knowledge with the students by lecturing
- Students are passive, just listening and taking notes
- Students learn the right answer from their teacher

Participatory Training

- Trainer's role is to ask questions and to facilitate discussions
- Both trainers and trainees are knowledgeable and experienced
- Everyone must reflect on her/his own, then share their ideas, experiences and expertise
- Trainees are active and analytical, asking questions and exploring alternatives
- Trainees develop their own answers. Indeed, there may be many different answers.

When facilitating a training programme, the objective is not to take the role of the expert; rather facilitate the group to learn by allowing the learners to bring forth their own expertise, shaping this experience within the context of the new knowledge and skills being explored and helping the learners to discover their own solutions.

This is a different model of training to the more traditional approached which have been strongly-trainer-centred. The facilitator requires significant expertise in the subject area, but rather than going into prove how cleaver and knowledgeable they are, the facilitator should have the intention of highlighting how cleaver and knowledgeable the learner is. This represents a significant difference in terms of the behaviours a facilitator will demonstrate.

The trainer's role

A trainer during the same training, or even the same session needs to play many different roles, depending on the setting of the training, the purpose of the session, the type of participants, the group dynamics and the training context.

Every trainer needs to find her or his own style as a trainer, balancing all these different tasks. Each trainer has their own strengths and weaknesses in carrying out these different roles. Some roles will be easier to perform, while on others you will have to work harder.

Delegator	Learner
Entertainer	Evaluator
Leader	Facilitator
Teacher	Lecturer
Observer	Interpreter
Organiser	Listener
Time keeper	Moderator
Negotiator	Designer
Role Model	Manipulator
Instructor	Motivator

So when conducting training, the trainer has two key functions to carry out:

1. Facilitating the contents by:
    - Presenting new information and material for the group to consider
    - Demonstrating new techniques or skills
    - Setting tasks and activities for the group to explore
    - Identifying themes or common thread in a discussion
    - Summarising, documenting and organising the ideas generated by the group.

2. Facilitating the process by:
    - Modelling appropriate learning behaviours
    - Making sure everyone gets a chance to participate and provide input
    - Monitoring group process and performance
    - Providing additional guidance as required
    - Identifying feelings that are interfering with the group's work
    - Helping members to express and deal with conflict.

In changing from a more traditional trainer-centred approach to a strongly learner-centred approach, some learners may feel a little lost. This is especially the case for some adults who have not engaged in formal learning for a long time or are use to an approach where the trainer lectures and 'spoon feeds' the group by providing all the answers without an opportunity to think and reflect on the new material being delivered.

An important skill a trainer may have to cover with a group of learners is learning how to learn. Some important attitudes and skills needed to be an effective facilitator of learning programmes are:

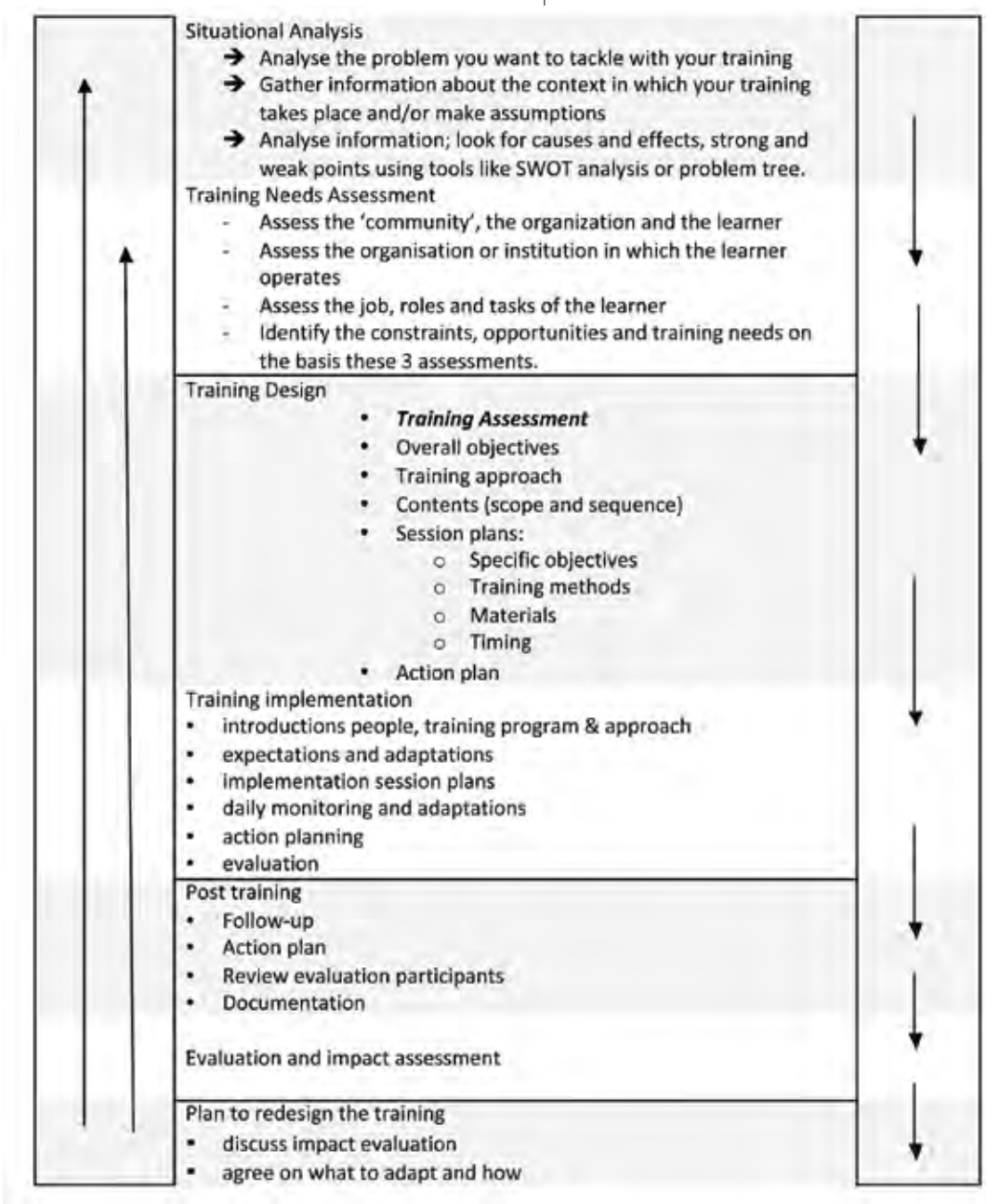
- **Openness:** the ability to invite dialogue, receive feedback, and be prepared to examine your values and opinions and to change them, if necessary
- **Sensitive/empathy:** the ability to pick up implicit messages; to see problems through the eyes of the participants; to understand

their feelings, ideas and values; to focus on roles rather than on personalities or competence

- **Basic communication skills:** the abilities of active listening and observing, questioning, probing, creating dialogue, paraphrasing, giving feedback,
- **Diagnosing:** the ability to define the problem and choose appropriate intervention
- **Supporting and encouraging:** ability to provide verbal and nonverbal indicators of encouragement, appreciation and caring.
- **Challenging:** the ability to confront, to disagree, to stop a process without being rude
- **Managing conflicts:** the ability to resolve conflicts by negotiation and mediation
- **Modelling:** the ability to include yourself as a model in the group, responding spontaneously, without being idealistic, posing as an expert.

9.3 Training design and session planning

Presented is a simple training design cycle in which each phase must be systematically considered for the full learning outcomes of any training programme to be realised.



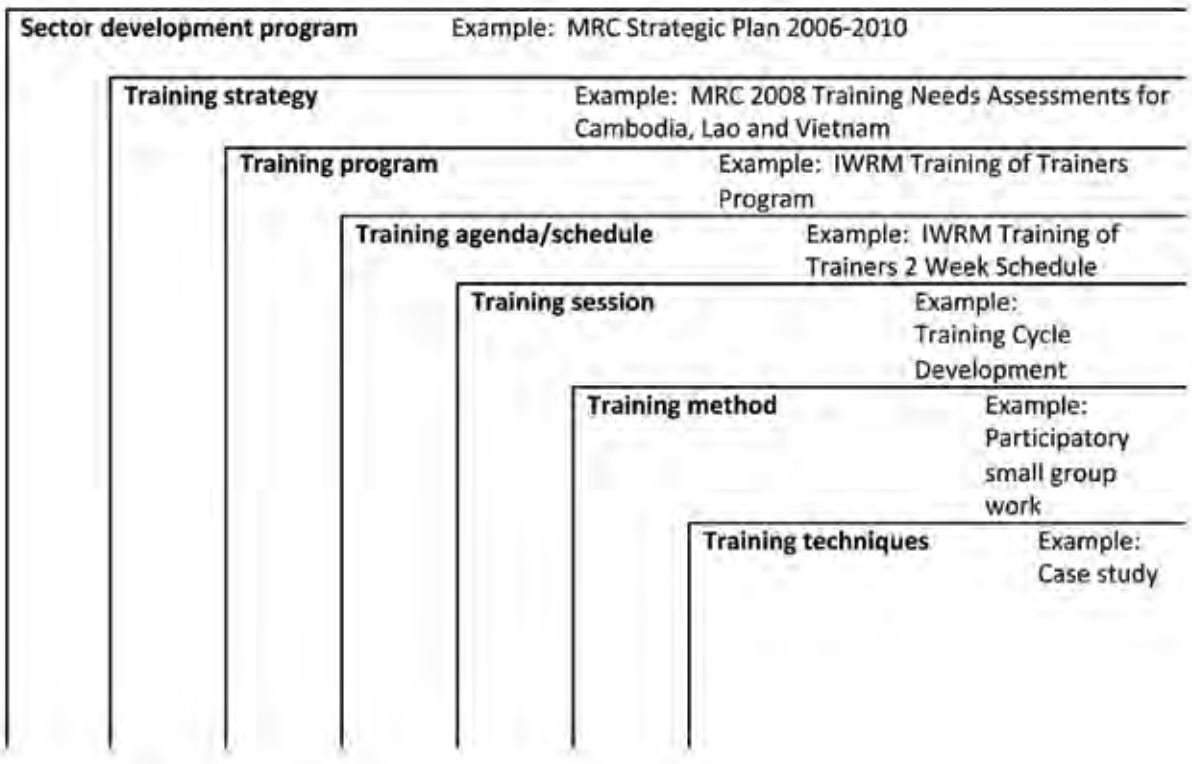
Although, initially it may appear strange to plan an assessment at the very start of the training design process and before you know what you are training in, this practice insures that the training is going to meet the outcome as opposed to making the outcome meet the training.

Hence, when designing and developing and training programme, you need to work backwards by following the steps listed below.

- Determine the learning outcome
- Study the subject material
- Design the assessment
- Prepare the body
- Prepare the introductory material
- Prepare the conclusion
- Prepare training aids
- Prepare the lesson plan
- Rehearse
- Prepare the venue

Training strategies

In developing up the content and structure of any training programme, it is important that there is consistency with training and sector strategies and links between activity levels.



A training strategy explains, based on certain assumptions, how we want to achieve our training objectives, using activities or methods suitable for target group, taken into consideration the context or available resources. In other words a training strategy determines how we package the identified training needs into a training programme in order to meet these needs. A training strategy is important, because

- It explains why a certain combination of methods and means is selected to reach specified objectives.
- It explains why emphasis is given to certain type(s) of training events and supporting activities.
- It explains how a particular set of objectives can be achieved given a specific target group, available resources, working conditions and socio-political context.
- It makes the assumptions regarding to learning and change explicit.

Below are a variety of training approaches that can be bundled together to form a coherent training strategy:

- International training
- National training
- In-service training
- Training of trainers
- Participants as co-facilitators
- Long-distance learning through radio, television, audio and/or video tapes and computer programmes
- Individual self study, self directed learning
- Contract learning
- Apprenticeships
- Internships
- Coaching
- Classroom training
- Field based training
- Outdoor survival training
- Study tours
- Exchange visits
- Building networks
- Peer feedback
- Roving training/ workshop, information market
- Writers workshops

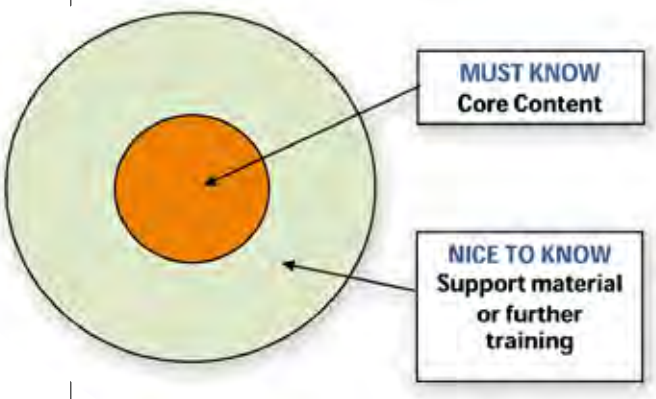
It is important that your training strategy be based on the outcome of your training need analysis, the learner's profile and their organisational goals and the organisation supporting the training and their sector development goals.

How to assess your training strategy?

1. What are the underlying assumptions?
2. Do you think that a programme based on this strategy will be effective in the present context and under the conditions given? Will it realize the desired changes?
3. Will the training strategy lead to an efficient training programme? Does the plan use minimum inputs to realize the required changes? Is the programme realistic in its assumptions regarding availability of financial, human and other resources?
4. Does the strategy relate well to the characteristics and conditions of the potential participants?
5. Is the plan flexible? Will it still work under scarcity conditions?

9.4 The training agenda

When deciding on what contain within a training programme to focus on, ask yourself: In order to achieve the learning outcome, what must the participants know? What is the core material?



The purpose of a trainer's agenda is to create a 'master plan' so that the core content is introduced and explored by participants in a logical and systematic way. It is only for the trainers, but is a very practical tool because it provides you with a clear overview and makes it possible to:

- Check the training has a logic flow over the weeks and days
- Check that the training objectives are met in the allotted time
- Assess the variety of training methods
- Assess whether the timing of the sessions is feasible or not
- Share your design with peers, to receive feedback and improve on it
- Share with co-trainers and resource people, so that they can better prepare themselves.
- Provide enough time to open and close each day, to refresh, to energize, to summarize, link and provide the opportunity for daily feedback.

A training agenda includes a detailed training schedule, including the timing and objectives of every session and resources and resource people required. The participants' agenda should only be a summary of the trainer's agenda and only be limited to general topics and approximate time allocations to allow for flexibility.

Why is designing an IWRM trainer's agenda so challenging?

Designing a good IWRM training agenda is difficult because it requires:

- Knowledge of the many design options available;
- Skill in using them;
- Creativity in manipulating the various options to enhance participants' involvement and effective learning
- Sound knowledge of IWRM, but not necessarily a high level of knowledge in all aspects of IWRM
- A working knowledge of the terminology of IWRM (see the Glossary at the end of this Training Manual)
- Ability to readily access other case studies beyond this included in this Training Manual
- A basic knowledge (say first year of university level) of hydrology
- To oversee the big picture while handling the details of each learning moment
- Self-confidence that allows you to be creative and to take risks
- To be flexible and open for changes if things go wrong or if a better opportunity presents itself as the training goes on.

Training is both exciting and, at times tiring – and that is why the design phase is so challenging. The task of sequencing learning events is part logic, part experience, part intuition and part good common sense. Sequencing, or deciding what comes next, is both a micro and macro concern. The trainer's agenda is a tool to work form the macro down to the micro level.

How to develop a trainer's agenda?

There is no one way of learning and therefore there is no one way of developing and sequencing learner activities. What follows is a suggested approach;

1. Prioritize and select the training needs. The highest risk in any design is to over load the programme. Therefore it is crucial to distinguish between what your learners:
   - Must understand or master
   - Should understand or master
   - Could understand or master
2. After the selection you have to start sequencing the topics over the available time. One way of sequencing is to find a framework for the overall flow of your training course. A framework helps you to design a logical flow, link sessions and helps the learners to build upon what they have already learned.
3. Distribute the topics following the flow over the allotted time for the training. For example if it is a three weeks training, divide the topics over the three weeks in a logical way. Then divide the topics over the days in each week, to finally divide the topics within each day into sessions.
4. Write out the time, topics, objectives and materials for each session in a trainer's agenda.
5. Review and preferably discuss your first trainer's agenda to make sure that:
   - The programme is not overloaded

- The nature of the training day and week is taken into account: slack periods after lunch, fourth day in the week, Friday afternoon feelings etc.
- Opportunities for humour and fun are included such as icebreakers, openers, art, music, puzzles, games and movement.
- The more 'threatening' activities (role-plays, fish bowls, and certain types of energisers) take place later in the programme.
- Adequate support materials are included for each session, such as worksheets, instruments, and quizzes to check understanding.

The agenda of a training programme is a basic component to learning effectiveness and is why the design of any training activity needs care.

9.5 Setting learning objectives

Learning objectives are a description of performance and are what you want your learners to be able to do at the end of a session and as such are vitally important for any training programme and any training session.

1. **Objectives are the foundation for training and session planning.**

   They provide the basis for training design and planning, including content and methods. (If you don't know where you are going, how will you know how to get there?) Writing learning objectives forces you to decide what exactly the participants 'need to...' and what would be 'nice to know'.

2. **Objectives allow for testing of outcome.**

   Setting clear and specific learning objectives lets you find out whether the objectives have been accomplished. (If you don't know where you want to go, how will you know that you have arrived?)

3. **Objectives give clear directions to the learner.**

   A good objective tells the participant what's going on allowing learners to better participate in the learning process; they don't have to guess what's expected.

How to write specific learning objectives?
Learning objectives describe the intended outcome of a training programme or session, rather than the process of the session itself and as such should answer three questions:

1. **Performance: what should the learner be able to do at the end of this session?**
2. **Conditions: under what conditions must the performance occur?**
3. **Criterion: how well must it be done?**

Using verbs or 'doing word' when writing learning objectives increases the strength of any learning objective by ensuring performance can be measured.

Verbs for knowledge

apply	assign	average
classify	compare	conclude
contrast	decide	define
demonstrate	design	diagnose
differentiate	discuss	distinguish
estimate	evaluate	examine
explain	identify	illustrate
interpret	justify	name
prepare	qualify	rate
recall	repeat	select
state	summarize	

Verbs for feelings and attitudes

accept	advocate	agree
argue	approve	attempt
attend	avoid	balance
believe	challenge	change
choose	comply	conform
cooperate	criticize	debate
decide	defend	devote
display	dispute	evaluate
favour	follow	influence
initiate	join	judge
justify	object	observe
organize	participate	persist
praise	prefer	promote
protest	pursue	question
recommend	reject	request
resist	resolve	respond
seek	share	support
volunteer		

Verbs for skills

adjust	administer	approach
assemble	build	can
collect	connect	construct
control	coordinate	communicate
cover	demonstrate	develop
guide	handle	manage
maintain	measure	mold
move	operate	perform
place	prepare	process
produce	read	reduce
remove	stop	transplant
use	write	

Examples of knowledge (information, theories & concepts) based learning objectives:

- *At the end of the training session, students will be able to write explain the importance of developing learning objectives for the development of any training programme and/ or session plan.*

Examples of skill (able to do, including physical, communication and thinking skills) based learning objectives:

- *At the end of the training session, students will be able to demonstrate two participatory training methods.*

Examples of attitude (thoughts, feelings about people, ideas and experiences) based learning objectives:

- *At the end of the training session, students will be able to debate the importance of gender sensitivity in IWRM planning and management.*

9.6 Developing session plans

A session plan needs to contain all the information to run a session - it should have enough information for another trainer to read and conduct the training session. The most important aspect of any session plan is to be in a logical and clear order as they are the building blocks of your training programme. If you only lecture you don't need session plans, PowerPoint is probably enough, however if you want to run participatory training events you need to write session plans to:

- check whether the session follows a logic flow
- check time feasibility
- avoid that you forget anything to prepare
- avoid that you forget anything to do or say during the session
- share your session with other trainers or resource people
- get feedback
- improve your session
- document your training

A session plan needs to read like a mini story, it needs an introduction, a body and a conclusion. The introduction prepares the learners for what they will learn during the training session and sets out the ground rules or steps for the session. The body is where the main learning activities take place and the conclusion is to confirm or review the learning outcomes and see if the learning objectives have been met.

A session plan can contain many elements, what follows are the most essential ones.

- **Objectives:** A session plan should first give objectives of the session. This can help the trainer to run the session and evaluate its effect.
- **Timing:** An indication of the time that the session will take is needed for planning the training agenda.
- **Materials:** Notes on preparations, space and materials needed make the trainer aware on what and how to prepare.
- **Activities or steps:** Simple instructions, guidelines, questions and exercises can be described here. It should also contain answers and detailed information on questions or subjects that are likely to come up during the training. Instructions should also be included on how to use the other material presented, such as visual aids and exercise sheets.
- **Visual aids, exercise sheets and handouts:** Any material needed to run the session, such as transparencies for presentation, worksheets for exercises, case studies and handouts should be included.
- **Comments:** Any comments about the application, possible impact, risks, warnings, or ideas for variations can be included here.

9.7 Training methods

Selecting appropriate learning activities is a critical part of developing a session or training plan. The activities chosen will provide a vehicle for learners to actively engage with the material as well as practice and apply the learning.
A variety of methods will be required as the learners will have a wide range of learning styles (see above). As such there is no clear guideline in selecting an appropriate training method. Method selection is a creative and analytical process during which many quite different issues need to be taken into consideration.

Every trainer has her or his personal favourite methods, depending on personal preferences, style and experience. However we should try to select an appropriate training method not on the basis of our own preference but mainly from the participants' viewpoint.

- *What are the learning objectives?* In terms of raising awareness, developing knowledge or building skills.
- *How much experience do the learners have related to the topic?* If they have experience, build on it and give them time to recall and share by using case studies, role-plays, simulations, brainstorming etc.
- *What is the participant's profile?* What is their age, sex, educational and social backgrounds, how are they used to learning, are they used to be trained?
- *What is your own experience, what are your strong & weak points?* You need to feel comfortable using the selected training method.
- *What is the practical situation like?* Is there available time, materials, resources, facilities for your selected training method?

The following overview will give you some hints of the type of application of a selected number of training methods.

Training method	Applications
Lecture	Transferring knowledge from trainer to participants Large number of participants Introducing new and complex topics and theories Introducing training modules and objectives
Structured discussion	Exchanging opinions and ideas Problem solving, Planning Strategy formulation Controversial issues
Small group discussion	Sharing experience Exchanging ideas and opinions Problem solving, Planning
Buzz groups	Reinforcing learning process Providing break in a lecture, to think, to process and to formulate Obtaining feedback Problem solving, Sharing
Brainstorming	Gathering ideas, past experiences Problem solving Creative/ innovative thinking Providing a refreshing break and creating group interest
Case study	Problem solving Decision making Analysis of complex situation
Demonstration	Learning a skill Operation software, machines and instruments
Field trip	Linking theory with practice Practicing skills Observation and reflection
Role-play	Training to face conflicting and stressful situations Teaching interpersonal skills, communication and negotiation skills To bring out the human dimensions of a case study To encourage emphatic behavioural patterns
Games	Management problems, Decision making Team building
Simulation	Management concepts, Decision making Team building Short and long range planning
Ice-breakers	Getting to know each other Encouraging interaction
Energizers	Energizing, enliven sleepy or bored groups Stimulating creative thinking, mind cracking Challenging basic assumptions Illustrating new concepts Group forming, Team building Fun

9.8 Facilitation skills

Facilitation can be described as a conscious process of assisting a group to successfully achieve its task while functioning as a group. As effective participatory training is based on the input of all participants, the trainer will need to facilitate both the learning process (the what) and the process of participation, sharing and group dynamics (the how).

Basic communication skills are essential for this to occur, but good communication is much more than having a simple conversation with somebody.

Non-verbal communication and observing

The facilitator's ability to read and understand the learner's body language, as well as controlling the message that he/she transmit through their own body language, can mean the difference between making a great impression or a very bad one! We communicate a great deal about how we feel by facial expressions, tone of voice, eye contact, pauses, hand movements and body postures.

For example, when asking questions, the use of non-verbal responses can be important. To pause after a question is answered may indicate to the learner to elaborate on what they have said. However, to remain silent too long might be perceived as threatening. The facilitator can encourage the learner to continue to speak by leaning forward, adopting a body position that indicates interest and responding positively with favourable noises, such as ('Uh-uh', Mmmm, `yes', 'OK'). A simple nod may also be encouraging.

Generally, how we say something may have as much impact as what we say:

- **How we sit:** This includes whether we are fidgeting, whether we have an open posture, or whether the posture is too open and therefore confronting.
- **How we stand:** It is often perceived that a person who crosses their arms is putting up a barrier between themselves and the other person, and may therefore be uncomfortable with that person
- **Our facial expressions:** Do we look happy, interested, nervous, annoyed?
- **Eye contact:** Is the eye contact we have with others culturally respectful?
- **Physical space:** Are we providing others with appropriate physical space for them to feel comfortable?
- **Vocal tone:** The tone of voice you use with your learner needs to be non judgmental and inquisitive. This means inviting the learner to feel

Observing is the ability to interpret non-verbal clues and to judge and monitor group work objectively. It is a basic facilitation skill that ensures a trainer can assess how people interact within a group and learn within a group situation.

Observation and understanding non-verbal communication are very important facilitation skills for a trainer and over time you will need to do this at speed, and without anybody really noticing it.

Listening

Hearing is Passive – Listening is Active

Listening is an important skill to develop as a facilitator and more difficult than we think. Few of us really actively listen to what another person is saying. In reality we think we listen, but we actually hear only what we want to hear! This is not a deliberate process but listening carefully and creatively (picking out positive aspects, problems, difficulties and tensions) is the most fundamental skill for facilitation. Actively listening or improving listening behaviour requires the ability to:

- Concentrate
- Apply objectivity
- Employ questioning
- Obtain feedback.

Questioning

Effective questioning techniques form an important part of the facilitation skill set and there are many different types of questions a facilitator could use to generate different results. An effective facilitator knows what they want to achieve by asking a question, and chooses the type of question which will generate the required result.

Type of Question	Explanation	Example
Open Questions	Open questions encourage participation and interaction. They can draw out the knowledge and experience of the learner.	Why do you think that happens? What can we do about this problem? How do you think we can deal with that in the future?
Closed Questions	Closed questions are used for confirmation. Closed questions can be answered with a one work answer- either yes or no.	Is everyone finished? Have you reached your target? Is the system working?
Direct Questions	Direct questions are asked of a specific person or group. This is a good way of encouraging someone who has knowledge or experience with a particular topic the share this with the group	Steven, you have experience in this area, how would you deal with this? Sam, would you like to share your experiences in overcoming these issues?
Indirect Questions	Indirect questions are open to anyone present to answer. The benefit of an indirect question is that learners are in control of their level of interaction, they can choose to speak or remain silent.	Why would we need to provide an introduction to a session? How could we capitalise on this opportunity?
Leading Questions	Leading questions lead the person to the answer the facilitator is wanting	I take it you have done this before, haven't you?
Factual Questions	Factual questions are used to confirm knowledge or facts. These are often used for quick quizzes to check learners have accurate recall of the facts.	What is the fuel to air ration? What are the different types of coal?
Probing Questions	Probing questions are used to follow up on the response that did not give sufficient depth or detail. Probing questions are always expressed as an open question.	Luke, you mentioned checking for safety; how would you go about this? Matt, when the mine wall collapsed, how did this affect the operation of the plant?

Responding to the answer

Developing effective questions is just the beginning and the facilitator needs to make sure that they respond appropriately to learner's answer:

- Always acknowledge that the person has responded
- If the response is lengthy, paraphrase it for the group
- If the person spoke softly, again repeat the answer or paraphrase it so the whole group hears what was said
- When the answer given is incomplete, acknowledge the response and wither probe further or redirect the question to the group for further details
- When an incorrect answer is given, acknowledge the person and then either ask the rest of the group what they think or ask for any other thoughts on the subject.

If the incorrect answer is allowed to remain unaddressed, the learners will often think that it is the correct answer.

Probing

Probing is asking follow-up questions in order to gain a deeper understanding of the issue. For example:

- *Can you explain further?*
- *Could you put it in another way?*
- *Can you please tell me more about that?*
- *But why, how, who, when, where?*
- *Anything else?*

Probing is rather like peeling away the layers of an onion to gain a deeper and better understanding of the issue. Probing is an important skill and has many different purposes as it can be used to:

- draw people out
- clarify questions, inputs and/or opinions,
- create dialogue
- solve problems

Good probing

- Listen actively
- Build the next question on the understanding of the previous answer
- Clarify information
- Single out the problem or main points

Poor probing

- Judge while listening
- Jump from one topic or issue to another
- Make assumptions
- Lose track by getting bogged down in details or side-tracked

Paraphrasing

Paraphrasing is repeating what somebody has said, using your own words. It is an important skill as it:

- Benefits the facilitator: The technique forces you to listen very carefully, because when the person has finished speaking, you know that you will need to repeat what was said. In addition, you have the opportunity to find out whether you really understood what was said.
- Benefits for the speaking person: Paraphrasing has both a calming and a clarifying effect. It reassures the speaker that his or her ideas are worth listening to. And it provides the speaker with the chance to see if others are listening to his/her ideas. In other words, it supports people to think out loud.
- Benefits for other people listening: They get a second chance to understand what the speaker has tried to share.

Paraphrasing can be used when a person makes very long, complicated or confusing statements, or when a person has problems phrasing his/her own thoughts clearly. But DO NOT OVERUSE paraphrasing too often as it will slow down interactions and eventually group members will become lazy listeners themselves.

Paraphrasing uses the following four-step model:

1. Listen carefully.
2. Use your own words to say what you think the person said, for example:

   'In other words…' or

   'Do you mean that…' or

   'It sounds like what you are saying is…'
3. Check by saying something like:

   'Is that correct?' or *'Did I get it?'*
4. If it is not correct keep asking for clarification until you understand what s/he meant.

Note: If the speaker's statement is one or two sentences, use roughly the same number of words when you paraphrase it. If the speaker's statement is too long, summarize it.

Providing feedback

Most people recognise that feedback is important and helps us to learn, but many people find it difficult to provide feedback, regardless of whether it is positive or constructive. Below are some hints for giving constructive feedback:

Mentoring, coaching, and tutoring

Mentoring, coaching or tutoring a learning support processes conducted outside the training room, but are important activities that should (where possible) complement a training programme.

Mentoring is a 'mutually beneficial relationship which involves a more experienced person helping a less experienced person to achieve their goal' where the mentoring relationship:

- Focuses on the needs of the mentee (the person being mentored)
- Fosters caring and supportive relationships
- Encourages all mentees to develop their full potential

Coaching: Mentors are facilitators who allow the learner to discover their own direction; while a coach has a set agenda to reinforce or change skills and behaviours, and may have specific learning objective for each discussion. The term 'coaching' is most often heard in the context of sports and there is much in what a sports coach does that is similar to what a learning facilitator coach will does.

Criteria	Bad example	Good example
Be **specific**, not general.	*Your are always so talkative!*	*Just when we were deciding the issue, you talked so much I stopped listening.*
Be **descriptive**, not judging	*You only want to annoy me!*	*I feel annoyed, because you interrupt me all the time!*
Receiver oriented, not giver oriented	*Let me tell you...*	*When you are ready I would like to give you some feedback on...*
Focus on **Behaviour** not on the person	*You are arrogant!*	*You often lifted your eyebrows, when I was talking. This made it hard for met to keep talking.*
Focus on the **positive**, Not the negative	*You don't smile enough..*	*You have a warm smile, you could use it more often, and it makes me feel happy to work with you.*
Asked for it do not impose it	*I am sure you want to know...*	*Please, tell me what you saw me do... Did everybody understand the point I wanted to make?*
Well timed	*Last week....*	*In general don't delay feedback. It carries more weight if given soon after the observation. The person can then relate it to the specific situation.*

Tutoring: A tutor is similar to a coach, in that they work with an individual to develop particular skills and knowledge. A learner will approach a tutor with some level of skill or knowledge in a particular area, and a tutor will work with the learner to solve a particular problem.

Informally, we have all tutored someone at some time, this may have been tutoring a child in the art of tying shoelaces or tutoring a friend to paddle a canoe. In the workplace, it may have been with a colleague in using a photocopier, or how to present a specific material to a group of learners.

>>> FOR CASE STUDIES, SEE SESSION PLAN 9.1: PREPARING FOR PARTICIPANT CASE STUDIES

>>> FOR FIELD STUDIES, SEE SESSION PLAN 9.2: PREPARING FOR A FIELD TRIP AND FIELD EXERCISE

Evaluating a training programme

Training evaluation is the systematic collection of qualitative and quantitative information necessary to improve training efficiency and effectiveness. It is an important part of all training programmes to:

- Determine whether training achieved its objectives.
- Assess the value of training programmes.
- Identify areas of the programme that need improvement.
- Identify the appropriate audience for future programmes.
- Review and reinforce key programme points for participants.
- Sell the programme to managers and participants.
- Revise or refine training design for future use.
- Judge success or failure of the training.
- Persuade funding agencies to continue or replicate the training, etc.

What Parts of a Training System should be evaluated? All parts. Different evaluators will be interested in evaluating different parts of the training. For example, trainers may be more interested in the process and outputs, while a funding agency may just want to know what the cost (input) and impact of training were.

When to evaluate?

On a daily basis: This allows the trainer to respond immediately to feedback, problems, or concerns and adapt the training programme to meet the participants' needs and the training objectives. Short participatory M&E exercises (see Annex 3) are useful here to seek feedback, ideas and for concerns to be raised.

Mid-way through the training programme: This allows the trainer to refine the process and correct small problems before they become big ones so participants can benefit from findings during the same training event. A midcourse questionnaire is useful here to help the trainer identify how well the participant has grasped concepts taught up to that point.

At the end of the training programme: This allows the trainer to refine future training activities and plan for supporting and following-up on participants who have been through the training programme.

- A post-test and checklists are used to evaluate if the training programme led to the desired participant knowledge, skills, and attitude acquisition.
- An evaluation form can be passed out to participants to get feedback on how they perceive the training activities, what is working well, and what suggestions they may have for improving the training programme.
- An evaluation form can be passed out to trainers to inventory what worked and what needs improvement.

After participants have returned to their work sites:

- Checklists, interviews, and questionnaires can assist trainers in evaluating how well the training programme prepared participants to apply new knowledge, skills, and attitudes in their workplace.

What to evaluate?

Most evaluation exercises measure mainly the satisfaction and enjoyment of participants at the end of a training programme. But a training programme should also be evaluated against the specified learning objectives to see if (appropriate) changes in knowledge, skills and attitude have occurred and if this is having an impact in the participants working environment. Therefore we also need to consider conducting evaluating participants' progress after a training programme has been completed.

	What	Who	When	How	Why
Level 1	Reaction: Did they like it?	Participants	End of program	"Smile Sheet"	Determine level of customer satisfaction. May indicate need for revision.
Level 1 deals with participant reaction and satisfaction. But, level 1 is an important first step in determining the success of a training program and the evaluation form can be designed in a way that makes it an effective data collection tool. Participants reactions help determine the effectiveness of a program and how it can be improved. This first level should not be by-passed because "If they do not react favourably, they will not be motivated to learn."					
Level 2	Learning: Did they learn it?	Participants, Trainers	During, before, after program	Pretest/post-test; Skills application through role-plays, case studies, exercises	Identify if the trainer has been successful in delivery of course content and achieving program objectives
Level 2 deals with what the participants actually learned during the training session - the extent to which participants change attitudes, improve knowledge, and/or increase skill as a result of attending the program.					
Level 3	Application: Did they use it?	Participants, Bosses, Subordinates, Peers	3 to 6 months after program completion	Surveys, interviews, observation, performance appraisal	Determine extent to which they have transferred what they learned in the classroom to the actual work situation.
Level 3 evaluation answers the question, "How has the training affected the way participants perform their job?" The purpose of level 3, or behaviour evaluation, is to • Evaluate what happens to trainees after they leave training and return to their jobs; • See how much transfer of knowledge, skills, and attitude has occurred; • Measure lasting results from training; • Identify areas in which trainees show greatest and least improvement; and • Compare follow-up and end-of program responses. Level 3 evaluation measures the changes in job behaviour that occurred because people attended the training program.					
Level 4	Results: Did it make a difference?	Participants, Control Group	After completion of Level 3 follow-up	Cost-benefit analysis, tracking, operational data	Determine if benefits outweigh costs. Ascertain degree of contribution of program to organizational goals.
Level 4, or results evaluation, measures the impact of training on the program or organization. It shows how the training contributed to accomplishing the goals or objectives of the program or organization. This type of evaluation is both difficult and time consuming. It is difficult to measure the impact of training because so many variables may come into play. It is difficult to determine whether a change was the result of the training, or another variable. Because of the complexity of this type of evaluation, it is rarely used.					

General steps in planning evaluation

1. Decide why to evaluate and for whom
2. Specify what to evaluate; which levels and which components at each level
3. Decide what information to collect from whom; participant, resource people, employers, villagers etc.
4. Select evaluation methods and techniques which fit best your purposes and situation
5. Develop and conduct the evaluation activities.
6. Integrate and analyse the data of the Training Needs Assessment, Daily monitoring, Participants Action Plans, Participants' Evaluation, and trainers' feedback and observations, feedback from employers, villagers, etc.
7. Take action based upon results, such as revise training events, develop new events and/or approaches, develop follow-up and support activities needed.

>>> **SEE SESSION PLAN 9.3: TRAINING REVIEW, EVALUATION AND CERTIFICATE CEREMONY**

Session Plan

9.9 Session Plan 9.1: preparing for participant case studies

OBJECTIVES

At the end of this session the trainer will have:

- Developed clear instructions to be emailed to participants prior to the training so that can develop up a clear and concise IWRM case study.

MATERIALS

- None

TIME for PREPARATION

- 2 hour minimum, but will depend on the complexity of the case study required by the trainer

PREPARATION

- None

STEPS

1. As the training programme has the dual objective of both strengthening the technical knowledge of IWRM and the training skills of the participants, a highly useful session is for participants to develop and lead a training session on a selected training topic.
2. Allocate sufficient time during the training to support the participants in the development and delivery of these sessions. The training schedule should be provided to participants prior to the training in which the session they are expected to lead is clearly marked. Time during the training programme should also be made available for participants to revise and review their presentation in light of what they are learning in during the training programme.
3. Clear instructions should be provided to participants 3 to 4 weeks prior to the training commencing so that they can collect the relevant information. Participants should work in groups of 2 to 4 in the preparation and delivery of the allocated session and the instructions need to clearly state that the trainers will work with and support participants in the development of the session they are to deliver.
4. Allocate a 'theme' or topic that the participants should present on that matches the technical material the trainer would like to cover. To ensure that participants don't arrive at the training with vague, general case studies or PowerPoint presentations on IWRM. The trainer needs to allocate 'themes' or topics for which specific presentations should be developed around. For instance participants could be asked to develop up a case study on:
    a. Participation in IWRM planning
    b. Payment for environmental services
    c. IWRM sub-basin planning
    d. The use of Environmental Impact Assessments in IWRM.

The trainer must given some thought to matching themes to the actual experiences of the participants – therefore some prior knowledge of the participants background and working knowledge of IWRM is essential.

5. The amount of information that participants need to collect prior to the training must be kept to a minimum. It is suggested that participants bring a PowerPoint presentation of 5-10 slides and one supporting document. The development and deliver of the session is not to 'test' the technical capacity of the participants but to build their confidence in the development and delivery of participatory training sessions.

COMMENTS

- Provided is an example of information sent to participant prior to an IWRM Training Workshop in Lao PDR.

- "To ensure that the Lao training programme is as interactive, participatory and useful in both building your training skills and your knowledge of IWRM in the Lower Mekong Basin, the trainers have asked if you could prepare a short case study before the training starts.
- Based upon this case study, the trainers will work with you to further develop this into an interactive and participatory session which you will be expected to lead. While this may seem a big task the trainers will work with you and allow plenty of time to develop learning objectives, prepare effective presentation methods; develop and test a range of participatory training methods and tools; develop short and participatory feedback processes; and write a session plans for your session.
- The trainers have asked if participants from each country can prepare a case study around the following themes. Please use your site, project or programme experience to inform these case studies:
  - **Cambodia:** Participation in IWRM planning
  - **Lao PDR:** Impact Assessments
  - **Viet Nam:** IWRM sub-basin planning
  - **Thailand:** Economic tools
- The material that needs to be collected and brought to the training only needs to be very brief; 5-10 PowerPoint slides plus one (1) supporting document. The PowerPoint slides should be a simple review of your case study and some of the challenges you have faced or achievements made.
- Please work in pairs in both collecting any background material and during the training programme to develop up your session
- An outcome of these sessions will be: 1) a well developed session plan, 2) a logical process to explore the topic that includes an introduction to the topic, a participatory exercise and a summary of the key issues covered, and 3) The strengthening of your capacity to further lead and develop IWRM training programmes in your country. As mentioned the trainers will help you in preparing these sessions but bring some information to the training workshop will help this process."

Session Plan

9.10 Session Plan 9.2: preparing for a field trip and field exercise

OBJECTIVES

At the end of this session the trainer will have:

- Organised the logistical issues for a effective field trip and developed clear instructions for an exercise to be completed by the participants during the field trip.

MATERIALS

- None

TIME for PREPARATION

- 4 hour minimum, but will depend on who will be responsible for the arrangement and management of all logistical issues related to the field trip.

PREPARATION

- None

STEPS

1. *A field trip allows many of the issues discussed* in the training room to be explored in greater detail and in more depth in the field. A good field trip can be both a highly educational activity and a great energizer. However a poorly planned and managed field trip can be dull and irrelevant to the training programme. Therefore good planning makes for a good field trip.
2. *Ensure that the field site to be visited has examples or activities* where the training learning objectives can be fully explored. The learning objectives for the training programme will dictate the content and process of the class-room based training programme and must also dictate what should be seen or explored during the field visit
3. *Invite suitable local resource people* to provide background information to the sites being visited: Ensure suitable resource people can provide information on the historical context of the site (or issues), current activities and future plans. Also provided invited resource people background information on the participants and the training programme, so they understand how the field trip fits into the overall learning programme.
4. *Planning all logistical issues carefully.* Well before the field trip is to occur, carefully plan all logistical issues related to the field trip. Some of the issues to consider are:
    a. Visit a variety of different sites and stakeholders to gain a broad overview of the issues.
    b. Use the field trip to support local and regional initiatives and networks.
    c. Provide background material to participants prior to the field trip so that they can read up about the location and the issues they will visit.
    d. Consider the needs of all participants particularly the elderly, disabled and women.
    e. Provide plenty of good food and drinks and ensure time for discussion and debate during the breaks.
    f. If there the group is large, use a portable PA system in the field so that everyone can hear.
    g. Avoid long bus trips if possible and ensure there are appropriate toilet opportunities.
    h. Leave time at the end of each session for an informal review and discussion.
    i. Don't fill up the field trip with lectures: adults like to have time for discussion and debate so as to test their ideas and experiences.
    j. If the trainer is not familiar with the site, make sure somebody that is familiar wit the site organizes and manages the field trip.
5. *Ensure that the safety and comfort of all participants through* out the field trip. A happy and comfortable participant is also a happy and comfortable learner who is enjoying the learning experience.

6. *Fully brief participants the day before the field trip.* Make sure all participants know the field trip schedule (departing times, transportation options, meal options, clothing requirements, weather, etc) the day before the field trip. During this 'briefing' session also ensure all participants are aware of the field trip exercise (if one is to be set).
7. *Develop an exercise for participant to consider* during the field trip and completed at the end of the field trip. To ensure participants are active during the field trip develop up an exercise that utilized the unique features of the field site and matches the learning objectives of the training programme. Be creative and innovative, but consider:
    a. Dividing the participants into small groups (4 to 6) and assign a different stakeholder role to each group (i.e. Government, NGO, industry, community) and get each group to assess the situation or issue being explore during the field trip through the 'eyes' of a stakeholder group.
    b. Developing up a case study based on the field trip, but adjust the case study so that there is a 'problem' that the participants must resolve. For instance if a wetland is visited, develop up a case study where a dam is to be constructed that would impact on the hydrology of the wetland. Get participants to assess the impact of the dam based on what they have learned during the field trip, their own experiences and knowledge gained during the field trip.
8. *Provide sufficient time back in the training room* for the learning outcomes of the field trip to be reviewed. Ensure time has been set aside for the participants to complete their field exercise back in the training room and reflections and learnings from the field trip can be explored.

Session Plan

9.11 Session Plan 9.3: training review, evaluation and certificate ceremony

OBJECTIVES

At the end of the session the participants will be able to:

- Assess and comment on learning outcomes from the training programme, thereby allowing the trainers to improve the training programme for future delivery of the programme.

MATERIALS

- Evaluation questionnaire
- Two alternatives are provided.

TIME

- 30 minutes

PREPARATION

- PowerPoint presentation that reviews the training programme, expectations (participants and trainers) and learning outcomes

STEPS

1. **Introduce** the session as the final review session.
2. **Using PowerPoint**, provide an overview of the entire training programme. During this highlight:
   - Training aims and objectives
   - Participant expectations
   - Key learning points
   - Any amusing or funny incidents along the way.
3. **Seek any final questions** from participants.
4. **Handout training evaluation form,** indicating that it is completely confidential and participants do not have to put names on the questionnaire.
5. **Allow 15 minutes for participants to complete the questionnaire** and get them to place the completed questionnaire in a pile face down.
6. Once all participants have completed the questionnaire, **thank them for their input** and conclude the training.
7. **Conduct** the certificate ceremony.

COURSE EVALUATION

What is your objective to attend the course? _____

_____

_____

Please circle the number which most closely corresponds with your view

1. To what degree did this course contain information and/or skills that were:

Relevant	**5**	**4**	**3**	**2**	**1**	**Irrelevant**
New material	**5**	**4**	**3**	**2**	**1**	**Very familiar**
High quality	**5**	**4**	**3**	**2**	**1**	**Poor quality**

2. To what extent were the goals and objectives of the course achieved?

Great deal	**5**	**4**	**3**	**2**	**1**	**Very little**

3. Was there balance between theory/discussion/activities?

Well balanced	**5**	**4**	**3**	**2**	**1**	**Not Balanced**

4. How well presented was the information?

Very well	**5**	**4**	**3**	**2**	**1**	**Not well**

5. How relevant was the information to your position/employment?

Very relevant	**5**	**4**	**3**	**2**	**1**	**Not relevant**

6. Will you be able to use the information and/or skills in your current or future roles?

Great deal	**5**	**4**	**3**	**2**	**1**	**Not at all**

7. How much did you enjoy the course?

Great deal	**5**	**4**	**3**	**2**	**1**	**Not at all**

8. How suitable was the time allocation for the course?

Very suitable	**5**	**4**	**3**	**2**	**1**	**Not suitable**

9. How much benefit do you think you have gained from participating in this course?

Great deal 5 4 3 2 1 Little benefit

10. How suitable was the venue for the training session?

Very suitable 5 4 3 2 1 Not suitable

Please write your answers to the following questions in the space provided.

11. What do you think were the three best features of the course?

a. _____

b. _____

c. _____

12. What were the three least successful features of the course?

a. _____

b. _____

c. _____

13. Are there any comments, suggestions that you would like to make about this course?

_____

_____

_____

THANK YOU FOR COMPLETING THIS EVALUATION

COURSE EVALUATION

1. Please circle the number that reflects your overall satisfaction with the workshop:

Very satisfied - Excellent	Satisfied	OK	Not Satisfied	Very Unsatisfied – Very Poor
5	4	3	2	1

Why?

2. Please indicate if your feel the objectives of the workshop have been satisfactorily met (please tick the appropriate box)

Objective	**Very satisfied**	**Satisfied**	**OK**	**Not Satisfied**	**Very Unsatisfied**
1. Insert training objective					
At the end of the training, participants will have:					
• Insert learning objective 1					
• Insert learning objective 2					
• Insert learning objective 3					
• Insert learning objective 4					
• Insert learning objective 5					
Did the workshop meet your expectations					

3. What did you think was the most useful part of the workshop? Why?

4. What do you consider to be the least useful section(s) of the workshop? Why?

5. Please comment on the length of the workshop: (too long, too short, etc). What would be the best length and why?

6. How relevant was this workshop to the kinds of problems and issues that you face in your work situation?

7. What changes have you experienced as a result of the workshop?
(for examples what changes to your knowledge, skills and/or attitudes?)

8. How likely are you to recommend this workshop programme to a friend or colleague?

Very likely – Yes it is essential	Likely	Perhaps	No Likely	Not at all
5	4	3	2	1

Why?

9. Other comments:

Thank you very much for your help, your hard work and your contributions.
Have a safe trip home and we look forward to working with you again!

Annex 1
Different Training Scenarios

Develop different training scenarios to match participant needs

Provided in this manual is a 10 day IWRM training programme, but depending on the focus, objectives, target groups and time available different training schedules (curriculum) may have to be developed. This will require careful planning and consideration for the learning needs of the participants.

IWRM training programmes (3 days, 5 days, 2 weeks)

Draft Schedule - 3 day IWRM Training Programme

Day	Day 1	Day 2	Day 3
8:30	Registration	Daily intro	Daily intro
8:45	Welcome and Introduction	IWRM Planning Cycle	Impact Assessment
10:15	Break	Break	Break
10:45	What is IWRM? Driver of Change	Basin and Sub-Basin Strategies and Plans	How to address conflict
12:15	Lunch	Lunch	Lunch
1:15	Transboundary RBOs and National Organisations	Field Trip	Negotiating water agreements
2:45	Break	Break	Break
3:15	Policy, Law and Finance	Field Trip	Action Plan – Where to next?
4:45	Daily evaluation and close	Daily evaluation	Evaluation
5:00	Close	Close	Close

Draft Schedule - 5 day IWRM Training Programme

Day/ Theme	Day 1 – Monday	Day 2 – Tuesday IWRM Enabling Environment	Day 3 – Wednesday IWRM Management Tools	Day 5 – Friday
8:30	Registration	Daily intro	Daily intro	Daily Intro
8:45	Welcome and Introduction	Enabling Environment	Stakeholders / Organisational Mapping	Field Trip Review (role play from field trip)
10:15	Break	Break	Break	Break
10:45	Expectations, Norms and Working Groups	Policy, Law and Finance	How to address conflict	Impact Assessment
12:15	Lunch	Lunch	Lunch	Lunch
1:15	What is IWRM? Driver of Change	IWRM Planning Cycle	Field Trip	Negotiating water agreements
2:45	Break	Break	Break	
3:15	Transboundary RBOs and National Organisations	Basin and Sub-Basin Strategies and Plans	Field Trip	Action Plan – Where to next?
4:45	Daily evaluation and close	Daily evaluation	Daily evaluation	Evaluation
5:00	Close	Close	Close	Close

Draft schedule -10 day IWRM training programme

Week One

Day/ Theme	Day 1 – Monday	Day 2 – Tuesday IWRM Enabling Environment	Day 3 – Wednesday IWRM Management Tools	Day 4 – Thursday Field Trip	Day 5 – Friday
8:30	Registration	Daily intro	Daily intro	Field Trip	Daily Intro
8:45	Welcome and Introduction	Enabling Environment Introduction	Stakeholders / Organisational Mapping		Field Trip Review (role play from field trip)
10:15	Break	Break	Break		Break
10:45	Expectations, Norms and Working Groups	Policy	3 R's		Field Trip Review Cont.
12:15	Lunch	Lunch	Lunch		Lunch
1:15	What is IWRM? Driver of Change	Legislation and Regulatory Instruments	Participation and Power		IWRM Planning Cycle
2:45	Break	Break	Break		
3:15	Transboundary RBOs and National Organisations	Financing	Field Trip Prep		Weekly Review
4:45	Daily evaluation and close	Daily evaluation	Daily evaluation		Daily evaluation
5:00	Close	Close	Close		Close

Week Two

Day/ Theme	Day 6 – Monday	Day 7 – Tuesday	Day 8 – Wednesday	Day 9 – Thursday	Day 10 – Friday
8:30	Week 2 intro		Daily intro	Daily intro	Daily intro
8:45	Basin and Sub-Basin Strategies and Plans	KPIs for IWRM	Impact Assessment	Creating a Conflict	Action Plan – Where to next?
10:15	Break		Break	Break	Break
10:45	Basin Management Strategy	Water Resources Knowledge	Environmental Impact Assessment	How to address conflict	ToT Programme Evaluation Closing Session End of Programme
12:15	Lunch		Lunch	Lunch	
1:15	Developing a Sub-Basin Plan 1	Information Exchange	Environmental Flows	Negotiation	
2:45	Break		Break	Break	
3:15	Implementing a Sub-Basin Plan 2	Project Notification and Evaluation	Risk Assessment	Negotiating water agreements	
4:45	Daily evaluation and close	Daily evaluation	Daily evaluation	Daily evaluation	
5:00	Close	Close	Close	Close	

Annex 2
Training Logistical Arrangements

1. Logistical arrangements

In considering a new training programme, the 'space' in which the training programme will be run can influence the style of training considerably. While participatory training programmes can be held in a variety of locations, there are some basic requirements to help it run smoothly – namely room to move and flexibility to adapt.

Training Checklist 1: Logistical Issues

Seating Arrangement
- number of chairs
- mobility of chairs
- seating arrangement
- number of tables
- mobility of tables

Audibility
- outside noises
- inside noises (ventilator, microphone, chairs etc.)
- no microphones needed

Visibility
- windows; day light
- lights
- possibilities to make it dark
- presenter/ screen/ boards
- flipchart and overhead
- pillars blocking view

Atmosphere
- ventilation control
- temperature control

Space
- place for display
- place for group work/ plays
- equipment storage
- wall space to paste flip charts

Facilities
- presentable bathrooms
- coffee break service
- drinking water

Equipment
- white board
- pin board
- flipchart stand with clips
- overhead projector
- screen
- slide projector
- T.V. set
- VCR
- photocopy machine
- electricity
- no. and type of plugs
- extension cords
- computer facilities
- printer facilities

Hotel in general
- overall service (laundry, food, snacks)
- hygiene in the kitchen
- accessibility for participants
- accessibility by telephone fax or email
- leisure

Other:...
-

2. Training supplies and equipment

If you are to employ a lot of interactive and participatory small group work you will need to consider a range of stationary and make sure that the supplies required match the number of participants attending your training.

Training Checklist 2: Stationary Requirements

For each participant
- Files
- Separators
- Note books/ pads
- Pens
- Pencils
- High lighters
- Blank name tags

For the training room
- Flipchart stands
- Flipchart paper
- Whiteboard
- Whiteboard markers (chisel tipped)
    - Black
    - Blue
    - Green
    - Red
- Permanent markers (chisel tipped)
    - Black
    - Blue
    - Green
    - Red
    - Purple/ pink
- Masking tape
- Stapler/staples
- Glue sticks
- Hole puncher
- Sharpener
- Eraser
- Paper clips (also very big ones for flip chart stand)
- Multi plugs and extension cords
- Ruler
- Cutter
- Coloured posted paper
    - Blue
    - Green
    - Red
    - Orange
    - Yellow
    - Brown
    - White
- Package Index cards
- Package Post its: sizes…… colours……
- Overhead Projector
- Slide projector
- TV/VCR
- Computer
- Printer
- CDs
- Photocopy machine
- Package A4 paper (plain and coloured paper)

Where stationary is not available or too expensive, improvise. For instance coloured index cards can easily be made by cutting coloured A4 paper in half.

Annex 3
Monitoring and Evaluation of Your Training and Actions Plans

1. Simple, quick and useful participatory M&E tools

Gaining the participants' feedback and insights throughout the training is an excellent way to adjust the training to meet the participants' needs and pace of learning. The following are some short and simple monitoring and evaluation (M&E) tools that are extremely useful in doing this and can be used at the end of the day or after every couple of days in the training room.

The M&E tools below rely less on answering direct questions and more on small exercises, artistic expressions, and small games. This is done as many groups and individuals often struggle to answer direct questions and may simply say what the trainer wants to hear. A more indirect way, using creative expression to gain information, usually results in richer, deeper, more honest and complete information.

The following monitoring and evaluation tools have been adapted from the Regional Community Forestry Training Centre's (RECOFTC) excellent training manual 'The ART of Building Training Capacities', which can be accessed through the RECOFTC website (www.recoftc.org).

Are we on target?

1. Preparation:
   - Draw 5 concentric circles on a flip chart (similar to a dart board)
   - Make several pie-like divisions for the training aspects you wish to evaluate; for example, content, methods, facilitators, etc.
2. During feedback time, ask the participants to place their pins or stickers on each pie to reflect their rating (the closer to the centre the more impressed or satisfied they are).
3. After all the participants have placed their pin or sticker, invite the participants to take note of the general placement and investigate any pins that fall outside of the general choice of position.
4. Give a summary of the results of the group.

   Variation:
   - If there is a certain hierarchy of learning objectives you can write these objectives in the circles, with the highest in the centre. Ask participants to draw an arrow from the outside in the direction of the centre as far as they feel they reached with their learning.
   - Ask participants to add post-its to the pins or arrows with an explanation of why they placed the pin or arrow at that point, and/or suggestions for improvement.

Words remembered

Ask participants to write down words that, for example:

- best describe what you have learned or represent the training experience so far

These questions can be followed with questions like:

- Why did you choose these words? Or can you say more about the words chosen?

Piggy bank or saving box

Prepare enough 10, 25, 50 and 100 cent coins and a saving-box to collect the coins in. Ask the participants to select the coin that represents their satisfaction with the day. If fully satisfied they put in a 100 cent coin, if half satisfied, 50 cents, etc, but they can use only one coin.

Using metaphors to capture feelings or learnings

Ask the participants to compare the training with a meal and write down the meal that best represents the training experience so far, and why this meal was chosen.

Using drawings

Ask the participants to draw their feelings about the day and ask them why they drew this picture.

Feedback cards

Distribute cards or post-its. Ask the participants to write a brief answer to the following:

- What was most helpful today? Followed by Why? or
- What was most useful, interesting, and difficult? What did you like most?

You can add questions like:

- What was least helpful, useful, and difficult? What did you not like? followed by
- What could have been improved? Or Any suggestions?

After the cards are collected, there are different ways to go about it.
If time,

– Shuffle, redistribute and have persons read them aloud; or:
– Post the cards and ask participants to cluster the cards as they are posted. Discuss after all have been posted and clustered; or:
– Take the cards, summarize them overnight and give the feedback in the morning.

Tossing the ball

Write a number of key questions on one sheet about the aspects that you would like to monitor. Form a ball with the paper and ask the participants to stand in a circle and toss the ball around as long as you have turned your back to them. Turn around and say 'stop'. Ask the person who has the ball to open it up and answer the first question. If necessary you can ask the others to add or help. Repeat the procedure until all questions are answered. As this is a rather direct way of asking for feedback, do not touch on sensitive issues or feelings with your questions; rather, focus on what they learned.

Variation: use music to signal when it is time to toss the ball and when to stop.

Complete the sentence

Display (or photocopy for each participant) open-ended sentences directed at the aspects of the training that you want to be evaluated, for example:

- I find the training effective because...
- The training could be improved by....
- The facilitators could be more effective if...

You can have the participants answer all the questions displayed or choose the ones they would like to respond to.

Mood meter

Prepare a mood meter sheet with a happy, a neutral and a sad face on it. Explain the symbols to the participants and post this sheet at the exit of the room. Ask participants to mark their mood with a sticker or a marker pen. A variation is to use post-its on which the participants write comments to clarify the moods indicated. It can be useful to use different colours for participants from different regions or institutions; this can show up sharp differences in perceptions.

Take care not to break anonymity by making groups too small. Another variation is to have a

continuous mood meter for the whole length of the training course and measure the moods at the end of each morning and afternoon.

Resents and appreciates

Arrange the participants in a circle, so that all have eye contact with each other. In turn, each participant completes the sentence: I didn't like it when...

This may refer to anything that happened during the day. Each person may choose to say nothing or complete the sentence as many times as necessary. No one should pass judgment or comment on what others have said. You, as the trainer, should begin the round and be as honest as you expect the participants to be. After everybody has answered this question, the procedure is repeated for what they appreciated. This time complete the sentence: I liked it when... The exercise finishes with the likes, so the participants finish on a positive note.

Mural

Using symbols, group members create a mural, which represents their collective feelings or thoughts about the day. The mural should answer only one question.

Human Continuum

1. Along a long wall post a sign at one end labelled 'nothing learned' and another labelled 'fully competent' at the other end.
2. Explain the continuum on the wall and ask the participants to think where they were at the beginning of the training in terms of knowledge, comfort and skill level.
3. Then ask them to stand up and place themselves on that continuum. After the participants have stopped moving, ask for three of four to share why they placed themselves on that continuum.
4. Next ask them to think about where they are now, at the end of the training, and to place themselves at the appropriate spot on the continuum.
5. Again ask for a few volunteers to explain why they placed themselves where they did.
6. Ask the group to value the activity, making sure to comment on how graphic their self-assessment is.

Poster exhibition

Write at the top of different posters aspects of the day you would like to have feedback on. Put up the posters and ask the participants to take a marker, walk around and write their feedback related to the aspects mentioned on the posters.

Fishbowl

Part of the group sits in an inner circle facing each other, with the others on the outside. Give them a question related to learning from the day to discuss. For example: what were the most helpful parts of today? And why? Only those in the inner circle can speak. Those in the outer circle listen. After a few minutes, have them change places (inner go to the outer and outer to the inner). You can also change the questions being asked. If the group is large (over fifteen people) use three rounds: one group first, then second, then third.

Monitoring wheel

Decide which 8 elements of the day you would like to monitor. Write those aspects on a wheel with 8 spokes and copy this wheel for all participants. Ask them to score each aspect (centre is low, outer circle is high) and draw a dot on each spoke accordingly. The dots are then linked, so that a web is created. Post all wheels and if time permits trigger a discussion on the outcome.

Review and rank learning objectives

Ask individuals or small groups to rank cards containing learning objectives, according to learning, usefulness, etc.

Opposite scales

Choose a number of aspects you like to receive feedback on, for example, the degree of difficulty, usefulness etc. For each aspect, draw a scale and assign scores to responses (for example, a positive score could get 5 and a negative 1, with 2, 3, and 4 in the middle). To make the answers more useful you can add why, comments, or suggestions.

Dividing a paper

Ask the participants to think about what they have learned today. Ask them to divide a blank page into free-form sections with each section related to an aspect of the day that was useful to them. They should label each section accordingly and explain why. The different sizes of the sections of the page should be proportionate to the usefulness of that aspect of their learning.

Faces

Distribute this handout and ask participants to indicate HOW they feel at the end of the day and WHY?

Why do you feel like that? _____

2. Formal evaluation of a training programme

The above M&E tools are ideal for quick, fun evaluation exercises at the end of the day. But generally a more formal evaluation of the training will also need to be conducted at the end of the programme. Provided are generally questions that can be easily adapted to suit your needs.

1. Please circle the number that reflects your overall satisfaction with the workshop:

Very satisfied - Excellent	Satisfied	OK	Not Satisfied	Very Unsatisfied – Very Poor
5	4	3	2	1

Why?

1. What did you think was the most useful part of the workshop? Why?

2. What do you consider to be the least useful section(s) of the workshop? Why?

3. Please comment on the length of the workshop: (too long, too short, etc). What would be the best length and why?

4. How relevant was this workshop to the kinds of problems and issues that you face in your work situation?

5. What changes have you experienced as a result of the workshop? (for examples what changes to your knowledge, skills and/or attitudes?)

6. How likely are you to recommend this workshop programme to a friend or colleague?

Very likely – Yes it is essential	Likely	Perhaps	Not Likely	Not at all
5	4	3	2	1

Why?

7. Other comments:

3. Developing action plans

OBJECTIVES

At the end of the session the participants will be able to:

- Reflect upon the training content, key issues explored and their key learning outcomes that may impact on their work.
- Document their key learnings and actions that must be undertaken after the conclusion of the training for the successful implementation of their IWRM projects/ programmes.
- Develop realistic and achievable action plans for the implementation or support of on-going IWRM practices in their home country or province.

MATERIALS

- Flip charts
- Marker pens
- Handout: Action Plan template

TIME

- 2 hours

PREPARATION

- Photocopy enough Action Plan templates for all participants or draw up an Action Plan on a flip chart.

STEPS

1. **Explain** that one of the challenges of the training is taking the training experiences and converting the valuable lessons learnt into the participants own working context.
2. **Distribute** the Action Plan template to each participant and suggest that participants from each country (or province) might like to team up to jointly develop up an action plan. However individuals can also develop up an Action Plan.
3. **Ask participants** now to reflect upon the whole training and to clearly identify activities that they believe must occur at the end of the training for IWRM to be achieved or promoted in their projects/programmes/ countries.
4. **Allow participants** 1 hour to complete the action plan and then ask for volunteers to share their intended action plan.

COMMENTS

- For this action planning session to be effective, a commitment must be obtained from both the participants and the organisation supporting the training (or the participant's own organisation) to support the proposed activities or, as a minimum, follow up with participants in 3 to 6 months after the training to ensure the action plans have been put into place.

ACTION PLAN

Name of participants:

What (are the main lesson learnt from this training?)

What (are the key actions and activities that must be undertaken after the end of the training for the successful implementation of your IWRM project/programme/country?).

Why (are these activities important for the successful implementation of IWRM in your project/programme/country?):

How (will you implement some of the key activities?):

Who (will you have to collaborate with, gain support from or share you new knowledge with?):

Annex 4
Energisers

These simple energisers are activities designed to make learning easier and more fun for both the participants and trainers alike. They are very useful to:

- Break the ice and to create opportunities to get to know each other better (icebreakers)
- Encourage interaction
- Stimulate creative thinking
- Challenge basic assumptions
- Illustrate new concepts
- Introduce specific material (warming-up)
- Form groups
- Enliven sleepy groups (especially after lunch)
- Have fun!

Good energisers need to be planned for so that they don't look planned: They should:

- Require 30 minutes or less (and often only 5-10 minutes)
- Demand little or no advance preparation
- Be simple to implement
- Not threaten anybody, or make people uncomfortable (some energisers are less suitable for older participants, men and women in mixed groups (body contact) or in certain cultures).
- Invite everybody to participate; including facilitators, observers, trainers etc. But never force participants to participate in an activity
- Maintain an acute awareness of group development
- Provide positive feedback

The following energizer tools have been adapted from the Regional Community Forestry Training Centre's (RECOFTC's) excellent training manual 'The ART of Building Training Capacities', which can be accessed through the RECOFTC web site (www.recoftc.org).

Other excellent energisers are written up in the booklet '100 Ways to Energise Groups: Games To Use In Workshops, Meetings and the Community' from the HIV/AIDS Alliance (which can be accessed through the HIV/AIDS Alliance web site - http://www.aidsalliance.org/sw1280.asp).

Which energizer to use and when?

All energisers are not the same. The list below groups them by their primary function.

1. Getting to know each other better

a. Name train

- Ask everybody to stand in a circle. Say your name and add the name of the neighbour to your right.
- Ask this neighbour to say your name, her/his own name and that of the neighbour to the right.
- Continue for all people in the circle, ending with the last person repeating all the names.
- Ask people to change places in the circle and challenge a volunteer to repeat all names.

b. Ball game

- Ask everybody to stand in a circle and throw a ball to somebody, saying your own name, the name of the person you throw the ball to and the name of the person to whom the receiver should throw the ball next.
- The person who receives the ball repeats their own name, the name of the person (s) he was requested to throw the ball to and the name that person should throw the ball to.

Variation:

This exercise can be done first with the name cards still on, and repeated when the cards have been removed.

c. Name game

- Divide the group in two and ask them to place themselves on either side of a sheet, so that neither group can see the other.
- Each group places one volunteer near the sheet.
- The facilitators will drop the sheet on the count of three.
- The two volunteers who are all of a sudden facing each other have to call out the name of the other. The 'loser' joins the group of the winner.
- Repeat this procedure until most people have had the chance to guess once.

d. Group yourselves according to…

- Ask the participants to stand up and group themselves according to: height, size, age, number of children, size of feet, number of trees planted in their lives, etc.
- After each ordering, give the participants the opportunity to observe the line to get a feeling for the composition of the group.

Variation: include a competition element by dividing the group into sub-groups. Ask each sub-group to order themselves and sit down when ready. The first group to get themselves into the right order wins.

e. Stand up If….

- Ask the participants to form a circle with their chairs and explain the purpose and procedure.
- Ask the first question: stand up if you are a father..... give people time to look around and ask people to sit down again.
- Ask the next questions in the same way: stand up if you…
- are a mother, like cooking, are a forester, have a girlfriend, like lectures, have been to Thailand before, like sports, like group work, have a boyfriend, do not like Thai food,.....(add your own course-specific questions)
- Ask if any of the participants wants to ask a question to the group.

2. Relaxers and Reflectors

a. Three deep breaths

- Ask everybody to stand up.
- Demonstrate how to take one deep breath, reaching out with your arms and standing on your toes.
- Ask them to repeat this three times while you count slowly from one to three.

b. Shoulder massage

- Form a fairly tight circle.
- Ask all participants to turn to their right and put their hands on the shoulders of the person in front of them.
- Give him/her a good shoulder massage.
- After one minute turn in the other direction and return the massage.

c. Meditation

Ask the participants to close their eyes, observe silence and concentrate on their breathing or massage their ears.

d. Worries aside

- Ask the participants to write all their worries on a piece of paper, fold it, and write their name on top.
- Collect the papers in a box. Assure participants that these will be kept confidential.
- Put the box aside and remind the participants that their task is to give attention and energy to the training.

- Bring the box back at the end to return the papers.

Variations:

- Participants write their worries but keep the paper in their own pocket.
- Participants can mentally place their worries in a box until the training session ends.
- The box with all the worries may also be ceremoniously burned if all the participants agree.

e. Recalling learning

At the end of this session ask the participants to do the following:

- Close their eyes, take three deep breaths.
- Travel back in time to the beginning and recall what struck them, what they learned, new insights, etc.

After two or three minutes ask volunteers to share their new insights.

3. Openers or Warm-up

a. Visualize

- Display a picture, cartoon, comic, photograph or poster related to the training as a whole or a specific topic to be discussed.
- Ask the participants to reflect on it, either individually or in (buzz) groups.
- Ask volunteers to share their reflections.
- Build on this reflection while introducing the new topic.

b. Quote

- Display a quotation, saying, proverb, poem or song related to the training as a whole or a specific topic to be discussed
- Ask the participants to reflect on it, either individually or in (buzz)groups
- Ask volunteers to share their reflections
- Build on this reflection while introducing the new topic.

c. Choose your spot

- Post four posters in four different corners of the room; each with one face representing the following opinions: strongly disagree, disagree, agree, strongly agree.
- Explain to the participants that the faces represent these opinions and that when each statement is read out (or displayed) they should choose the face which most closely represents their feelings.
- Ask all participants to stand in the centre of the room as you read the statement, and then go and stand beside the face that represents how much they agree or disagree with the statement. After they have discussed each statement in their sub-group, they should choose a spokesperson to share key ideas from the sub-group with everyone in the room.
- Read the statements one by one, allowing five to ten minutes for discussion and reporting back on each one.

d. If… then

- Ask the group to sit in a circle and divide them into two groups
- Write on the whiteboard: if...then...
- Explain that one half of the group will write the end to the 'if' sentence while the other group will write the end for the 'then' sentence. They can fill in anything they want. Give an example for both, such as; if I had time and then I would be very angry
- After everybody has finished one of the two sentences, say your 'if' sentence and ask somebody from the other group to continue with a 'then' sentence. This will produce many laughs.
- Reflect: ask the following questions:
  - What was so funny? The cause and effect relationship did not exist.
  - Does this also happen in our jobs? Why? Because we make too many assumptions.

4. Games focusing on team dynamics

a. Knotty problem

(Group own solving skills)

- Ask the participants to stand in a tight circle, close their eyes and stretch their arms in front of them.
- Invite them to clasp one hand of somebody else in each of their hands.
- When everybody is holding two other hands, they can open their eyes.
- Tell them to disentangle, without letting go of each other's hands at any cost.

Variation: ask one facilitator to unravel the knot within 3 minutes using verbal expressions only. Instruct him or her to keep their hands behind their back to prevent her/him from touching the group or using body language.

b. Find the leader

- Ask the participants to stand in a circle shoulder to shoulder.
- Explain that a volunteer will be sent out and that (s)he will have to determine the leader of the group, following these rules: (s)he can fail 2 times and if (s)he finds the leader within three times and/or one minute (s)he will be rewarded.
- Send the volunteer out.
- While the volunteer is out, explain to the group that whatever the leader does the rest will follow. Choose a leader and start with the first movement (clapping hands, stamping feet, shouting something etc.), changing every 15 seconds.
- Ask the volunteer to come back. Invite him/her into the circle while continuing the movements.
- If the volunteer correctly identifies the leader, the group rewards her/him with something.

c. Sitting on knees

- Form a very close circle, with each person circle facing the back of the next person.
- Try to all sit down at the same time on the knees of the person behind you.

Hold on to the rope (combining forces)

- Provide a strong rope of about 4 meters long.
- Divide the group in two and start a pulling competition.
- Then, knot the ends together and arrange the rope on the ground in a circle.
- Ask everybody to sit down around the circle and take the rope in both hands.
- Ask them while holding on to the rope to stand up all at the same time.
- Reflect on difference between the two exercises.

d. Fruit salad

- Ask people to select in their minds the fruit they like best.
- Place enough seats in a circle for everybody to sit on – but not your own.
- Remove your own chair and explain that if you call out a fruit these people that have selected the fruit called out have to change seats and try to find another seat.
- The next person without a seat will call out a fruit and the game continues.

Variation:

- Instead of calling out a fruit the person in the middle asks the question: do you love me?
- If the answer is yes: everybody changes chairs.
- If the answer is no the next question is who do you love:
- the answer can be like people wearing jeans, people wearing slippers etc.

Competition

1. Fighting over scarce resources

- Explain that the resources are the men and women in this classroom, and put up the following rules of the game:
  - Women are worth 25 cents
  - Men are worth 50 cents

- Facilitator will call out an amount of money and you will have to form groups which make up that amount
- People who do not manage to form the right amount in their group or alone drop out
- Do a trial round to give people a feel for how it works.
- Start calling out different amounts (depending on the number of people): 50 cents, 2.50, 1.25, etc.
- Stop until only a few people are left.

2. Turning heads (training reflexes)

- Ask the participants to sit in a big circle.
- Divide the participants into two groups.
- Ask one volunteer from each group to take their place on one of two chairs in the middle of the circle with their backs to each other.
- On the count of three the volunteers have to turn their heads. Explain that one group will win if the two volunteers turn their heads to the same side, while the other group will win if they do not face the same side.
- The volunteer who lost will be replaced by a new member of the same group.
- The group that runs out of volunteers first loses.

3. Trees and bushes

- Ask everybody to sit in a circle and have them count off 1,2,1,2...
- Explain that all the number ones belong to the group of trees and all the number twos to the group of bushes.
- Explain that if you call out trees; all the trees have to stand up with their arms up in the air, if you call out bushes the trees sit down and the bushes stand up with their arms spread to the sides.
- Call out at random trees, bushes, bushes, trees, trees, trees, bushes etc.
- The people who remain standing or seated at the wrong moment have to leave the circle.

4. Bottle and pen

- Arrange two soft drink bottles and two pieces of string with a pen knotted at the end.
- Divide the group in two and attach the string to the belt on the back of a volunteer from each group.
- Put the bottles behind the volunteers with the string, ask them to close their eyes while the rest of the team coaches their volunteer to drop the pen inside the bottle.
- The team who succeeds first in dropping the pen into the bottle has won.

5. Chasing the robber

- Arrange two shawls, one long enough to be knotted once around the neck and the other twice.
- Ask the participants to stand in one circle and explain that the person with the short shawl has to knot it once around the neck, being the policeman, and the person receiving the long one has to knot the shawl twice and is the robber.
- The shawls are distributed at opposite sides of the circle, are knotted, unknotted and passed around in the same direction.
- By the time both shawls meet the robber is identified and this person receives a punishment (like sing a song, tell a joke).

Brain teasers or crackers

1. Arm Folding:

- Ask the participants to fold their arms.
- Ask them to unfold their arms.
- Ask them to fold their arms but starting with the other arm (some people can do this immediately; other cannot do it even after trying several times over).
- Ask what happened? Why was the second time more difficult? What does this say about our behaviour? What kind of implications does this have for our jobs/ learning?

Variation: shaking yes and nodding no

- Show people that to express 'yes' they should shake their head from right to left and to express 'no' they nod their head up and down.
- Explain that if you say yes or no they have to repeat the appropriate movement.
- Ask why this feels so strange. What does this say about our behaviour? What kind of implications does this have for our jobs/ learning?

2. Join the Dots

- Draw the following dots the board or flip chart:

- Invite the participants to connect the dots with only 4 straight lines.
- If nobody can come up with the solution show how to do it:

- Ask them:

  What did we can learn from this?

  What does this challenge to think beyond existing frameworks mean to our learning or jobs?

3. Crossed or uncrossed

- Invite everybody to sit in a circle and explain that you will pass a pair of scissors to your neighbour.
- Say that you will pass the scissors either crossed or uncrossed.
- Invite participants to continue passing the scissors around the group.
- While this happens you will tell them whether what they say is right or wrong.
- The trick is that the cross and uncrossed does not refer to the scissors but the legs.

Reflect. *What did we learn from this*? Sometimes what we conflict to what we see. By observing we can find the clue. How does this relate to our job?

Energy and fun raisers

1. Triple A

Ask first: are we alive, alert, awake and enthusiastic? Yeah!

Then sing with the following movements
Alive: *left arm in the air*
Alert: *right arm in the air*
Awake: *make big eyes with your hands*
and
Enthusiastic? *shake your hips*
(Repeat 3 times)

2. Battle of Sports

- Divide the participants in groups, each of them will be assigned a sport including a slogan supported with movement:
  - Soccer: football kick
  - Baseball: baseball shoot
  - Bowling: bowling strike
  - Swimming: swimming jump
  - Cricket: cricket batting
  - etc.
- One group starts by repeating their slogan and movement 3 times, ending by mentioning the team that has to proceed. The trick is that the team has to yell and move as one and clearly call out only one other team to follow-up. If the group fails to do so the team is out.
- Afterwards reflect on what happened. Why did some teams last longer than others? What does this tell

Annex 5
Further Resources

The following manuals, toolboxes and resources are available to support training in integrated river basin planning.

All websites were available at the time of writing (September, 2009) but may have changed.

1. The GWP IWRM toolbox, undated

This web-based resource details over 50 tools for IWRM. Sections of this Manual draw directly from the Toolbox and the assistance of the Global Water Partnership is appreciated.
See: website

2. CAP-NET/UNDP, 2008: integrated water resources management for River Basin Organisations. Training Manual

The purpose of this training manual is to improve efficiency and effectiveness in the application of IWRM for sustainable management and development of water resources, targeted at river basin organisations. It includes chapters on introduction to IWRM, water resources management functions at the river basin scale, using indicators to measure progress and performance, stakeholder participation, water allocation, pollution management, monitoring systems, information management, economic and financial; instruments, and basin planning for water resources.

3. IWRM Guidelines at River Basin level (Unesco IHP/WWAP/NARBO), 2009

These guidelines include four volumes of guidelines about how to use tools to implement IWRM at the river basin level. Four volumes, start at Volume 1: website (a downloadable PDF).

4. A handbook for IWRM in Basin (GWP/INBO), 2009

It is proposed to translate this Handbook for IWRM in Basins into the four national languages for MRC/ICBP/BDP training purposes. The participants would be requested to read this handbook in advance of training. This ToT IWRM manual would focus on best practice guidelines for priority IWRM issues in most of the LMB countries (e.g. issues that are being or will be addressed in the next few years). These best practice guidelines will be developed from existing training material (for the Mekong Basin and worldwide). The training material for each priority IWRM issue would include exercises, role plays and other group learning activities. Sections of this Manual draw directly from the Toolbox and the assistance of the Global Water Partnership and the International network of Basin Organisations is acknowledged.

5. Integrated River Basin Governance: learning from international experience (Hooper, B, IWA Publication) 2005

IWA Publishing, London Publication Date: 01 Sep 2005 • ISBN: 9781843390886. Pages: 320 • Hardback

This book aim s to help the current and coming generation of water professionals learn how to design basin management. Providing a classification of river basin organisations and their use, the book also covers fundamental issues related to implementation: decision-making. institutions and organisations, information management, participation and awareness, legal and economic issues, integration and coordination processes, and building organisational and human capacity. Integrated River Basin Governance focuses on the social, economic, organisational and institutional arrangements of river basin management. Methods are outlined

for implementing strategic and regional approaches to river basin management, noting the importance of context and other key elements which have been shown to impede success. The book includes a range of tools for river basin governance methods, derived from real life experiences in both developed and developing countries. The successes and failures of river basin management are discussed, and lessons learned from both are presented.
See: website. Selected chapter PDFs available from the author.

6. Integrated River Basin Management: from concept to good practice (World Bank), 2005

These Briefing Notes consider five main attributes or features as crucial for good integrated river basin management: (a) clear and strong institutional arrangements, supported by clear regulations, decrees, or agreements and with well-defined implementing procedures; (b) good water-related data, information, systems, and models readily available to the river basin partners and those agencies and bureaus operating within the basin; (c) a complete and clear suite or package of basin-wide policies, procedures, and strategies to guide water and natural resource planning, management, and administration; (d) an appropriate form of communication and participation for all basin stakeholders and partners; and (e) basin sustainability performance indicators and an agreed approach to monitor and report on how the basin is being managed and the resources consumed and protected.
See: website

7. Mekong River Commission resources, undated

BDP Core Library: http://www.mrcmekong.org/programmes/bdp/BDP-core-library.htm
BDP documents: http://www.mrcmekong.org/download/programmes/bdp/02-SA-analysis.pdf

Glossary of IWRM Words

See the endnote for the sources of word definitions and funding support for the development of this glossary.

Accountability: A process which ensures actions are reported.

Adaptive management: A structured, iterative (ongoing through a sequence of rounds) approach that recognizes that the information used in making decisions is imperfect and that, as decisions are made, a process is in place to gain better information and adjust the implemented action accordingly.

Allocation: The units of water (volume or equivalent) provided to a recognised user for a given period – usually a year or a season

Apex body: The lead organisation that takes the most prominent decision-making role.

Aquatic ecosystem: The living and non-living natural components of a stream or other water resource.

Aquifer system: A series of geologic formations which consist of two or more aquifers divided by lower permeability units.

Aquifer: An underground geological formation of rock, sand or gravel, capable of storing water within cracks and pore spaces, and that yields water to springs and wells. The water contained in an aquifer is called ground water.

Backstopping: Providing additional support to somebody or something to protect somebody or something else.

Basic human needs: Water of required quantity and quality sufficient for human existence and primary household needs.

Basic water resources management needs: Basic water resources management needs are certain tasks that need to be implemented adequately in order for any water resources management to take place. These tasks include water resources monitoring, water use permitting, and compliance assurance with permit conditions and other regulations. If these tasks are not implemented properly then water availability, water quality, water use, and water issues are not known well enough to permit meaningful water resources planning and decision making on water management issues. Currently, the essential water resources management needs in Armenia need to be updated and revitalized to facilitate water resources planning and management.

Basin development strategy: An approach or 'line of attack' to managing and developing natural resources in a river basin; a carefully devised plan of action to achieve a goal, or the art of developing or carrying out such a plan; the words 'strategy' and 'plan' are often used interchangeably these days.

Basin: A large watershed – see 'watershed'.

Basin development and management plan (or 'integrated river basin management plan' or 'integrated catchment management plan' or 'IWRM plan'): A plan which sets out the goals, objectives and guidelines for management of a river basin's natural resources. It documents data, information, procedures and mechanisms found in the protocol. The contents of a basin development and management plan will vary according to the river basin context: the type, scale and severity of natural resources problems, the level of economic development of the basin's natural resources, the capacity of current institutional arrangements and organizations to manage the natural resource management problems. Contents of a plan include:

- Physical description of the basin
- Land use inventories
- Current water availability and demands
- Pollution source inventories
- Aquatic and terrestrial ecosystem needs
- Vulnerability to floods or extreme meteorological events
- Identification of stakeholders and mechanisms for participation
- Implications of changing land use
- Identification of priority issues (impact issues or user requirement issues)
- Short- and long-term goals for the river basin
- Water related development scenarios, future water demands + risk assessments
- Water allocation and water quality objectives
- Strategy, measures and action plans for the achievement of goals, including sub-basin management plans
- Financing of water use and management
- Responsibility and schedules for implementation
- Mechanisms for monitoring and updating
- Annexes including specific studies such as areas of significant environmental problems.

Benefit sharing mechanisms: Mechanisms which specify equitable water shares.

Best management practices (BMPs): Agriculture and other industry management activities designed to achieve an important goal, such as reducing farm runoff or optimizing water use.

Brackish: Water with a chloride level greater than 250 mg/l and less 19,000 mg/l.

Budget: A financial plan or statement which lists how monies will be and have been spent.

Buffer Zone: An area situated between two areas in possible conflict. The objective of establishing a buffer zone is to reduce the possibility of adverse impacts of land use upon water quality.

Bulk water: Relatively large quantity of water supplied or sold by a wholesaler to a retailer or agent. It would normally be understood that the retailer or agent would distribute the water among their customers (e.g., farmers or households) according to some pre-determined agreement.

Capacity building: The development of an organization's core skills and capabilities, such as leadership, management, finance and fund-raising, programs and evaluation, in order to build the organization's effectiveness and sustainability.

Catchment: See 'watershed'.

Compliance assurance and enforcement: Exercise of supervision over the implementation of conditions and measures prescribed by legal instruments and, if necessary, the sanctioning of non-compliance. For example, in Armenia the compliance of the water use permit holder with the conditions described in the water use permit (which is a legal instrument) should be regularly controlled. Compliance with the assessment of environmental fees and charges should also be strictly enforced, and be coupled with a vigorous program aimed at the collection of delinquent fees and charges. In case of substantial deviations from the conditions by the permit holder, an increasingly stringent set of sanctions should be applied through administrative and legal action, including warnings, fines, and penalties ranging from temporary suspension of permit holder's activities, permit forfeiture, to the shutdown of permit holder's facility.

Cone of influence: The area around a producing well which will be affected by its operation.

Consumptive Use: The quantity of water that is effectively removed from surface or ground water resources because it has been evaporated, transpired, or incorporated into products, or plant or animal as a result of human intervention in the water cycle.

Consumptive Use: Utilization of water which reduces the supply from which it is withdrawn or diverted.

Control structures: A man-made structure designed to regulate the level and/or flow of water in a canal (e.g., weirs, dams).

Cost accounting: Quantification of cost according to activity, time period and recovery unit (e.g., Ml of water used) for the purpose of recovering costs. The operating and maintenance costs of irrigation inside a command area will begin by defining and identifying all the relevant costs. Next, the systems used for sourcing and validating costs for the current accounting period will refined. Cost accounting is the essential pre-requisite to cost recovery.

Cost effective: The minimum cost within defined limits of performance and/or quality standards; for example, a cost effective public water supply would provide water which meets U.S. EPA drinking water standards and public preferences for taste, colour, and hardness; and is within a range of acceptable water pressure and some defined service reliability criterion.

Cost recovery: Imposition of a cost per unit of water sold that will recover costs as defined. If it is 'total irrigation operating and maintenance costs within a project area', that must be recovered, then this should be specified when making a reference to 'cost recovery'. The final critical step in cost recovery is invoicing all members within the command area for their share of the total cost.

Criterion: A criterion is a standard rule or test on which a judgment of decision can be based. Water quality criteria are based on specific levels of pollutants that would make the water harmful if used for drinking, swimming, farming, fish and aquatic life production, or industrial processes.

Cross-cutting programmes: Integrating actions which cover several different aspects of land and water management; IWRM plans should always be cross-cutting.

Demand management: Reducing the demand for water through activities that alter water use practices, improve efficiency in water use, reduce losses of water, reduce waste of water, alter land management practices, and/or alter land uses.

Demonstration: An activity which serves as an example to others.

Development space: The area of influence resulting from an incident that causes a situation to change or progress.

Distribution equity: Processes that help to ensure water users belonging to a particular supply system get a share of the annual/ seasonal allocation. This will not necessarily be the same share, but definition of prior rights will assist with delivery of equity.

Distribution headworks: Essentially the physical network of channels and ditches that are used to distribute water among recognised members of a project or scheme.

Drawdown: When a well is pumped, water is removed from the aquifer surrounding the well, and the water table or piezometric surface is lowered. The drawdown at a given point is the distance the water level is dropped.

Drivers of change: Major factors, processes or activities which cause changes on the earth's surface, changes to economic systems, land use and water use changes.

Economic instruments/market-based incentives: Economic instruments, often called market-based instruments, can be defined as policy instruments that create price signals to encourage companies and water users to make decisions that help achieve environmental objectives. Such instruments increase the cost of behaviour that harms the environment, and reduce the cost (or increase the value of behaviour) required to protect the environment. This is the "incentive objective" of economic instruments.

Economic instruments may be also used as a source of finance for environmental and/or water resources management, or for adding to the state budget. In practice, the incentive objective and the financial objective often occur at the same time. However, there are reasons for distinguishing between the two objectives when setting the levels of the fees or charges. Small levels do not change the pattern of behaviour of companies, but may still provide

significant revenue for financing essential water (or environmental) resources management needs.

Policy instruments classified as market-based instruments include Environmental Charges, User Fees for Natural Resources, Financial Incentives, Fines and Penalties, and Industrial Waste Exchanges. Other types of economic instruments include: fees for environmental services; deposit-refund systems; trading programs; input and output taxes; removal of import duties; and market stimulation for recycled goods through, for example, government procurement practices.

Economic principles: When applied to consumptive water, the term 'economic principles' refers to efficient capture, allocation, distribution and usage of water. Economic tools that assist these functions include competitive pricing, timely price reporting and transparent and informed decision making.

Economic value: The economic value or price of water at a time and place, with defined qualities can be established via its opportunity price in its next best usage. The scarcer water is the higher will be its opportunity value and price.

Efficient: Water used efficiently will be productive as defined by the relationship between a unit of input and units of output. Agriculture and industry will measure water use efficiency in terms of output per Ml of water purchased or consumed. Efficiency in the case of households could be litres per person per day.

Effluent: Water that is not reused after flowing out of any wastewater treatment facility or other works used for treating, stabilizing, or holding wastes.

Enabling environment: The "rules of the game" in water management; what makes it easy for stakeholders (people who have a say) to play their respective roles in the development and management of water resources. It also includes the forums and mechanisms, information and capacity-building, created to establish these "rules of the game" and to facilitate and exercise stakeholder participation. The GWP's IWRM Toolbox lists three groups of enabling environment tools: (a) national, provincial and local policies, (b) legislation and (c) financing and incentives. See www.gwptoolbox.org

Enact: To make happen.

Entitlement system: The use of water entitlements as a means of sharing scarce water resources among competing uses and users. The system will include 'efficiency' if it allows entitlements to be traded among different users within a defined supply area – such as a basin or storage.

Entitlement: A water right or expectation granted or purchased by a user specifying their permanent access to supply from a nominated source. The access right will normally be specified in terms of an annual volume and reliability but will not guarantee the volume received in any given year – that is the role of allocations. Water allocations can be tied to the land to which they apply or made free-standing. In the latter event, it will be possible for the entitlement holder to trade it independently of the land.

Environmental asset valuation: measures which quantify the ecological, economic and societal value of environmental assets which include goods (e.g. potable water, irrigation water and fish) and services (e.g. waste disposal, flood regulation and recreation). These assets depend on the characteristics of the ecosystem, whether it is an upstream catchment, a floodplain or a river delta. Some assets are directly related to aquatic ecosystems (such as to water supply and to fish), whereas others are indirect input to terrestrial ecosystems (such as soil moisture and land erosion).

Environmental Charges: Environmental charges require polluters to pay a fee for the pollution they produce. They "internalize" the social costs of pollution by forcing polluters to include the damage to the environment that they cause in the prices for their products. Examples of environmental charges are the water resources discharge and pollution fees, to be re-established in Armenia, according to instructions in the National Water Code.

Environmental flow assessment methods: these refer to a number of different techniques used to the amount of water needed in a watercourse to maintain healthy ecosystems. Various methods are available: hydrology-based, hydraulic ratings, habitat simulation, holistic (assessment of whole ecosystems); downstream response to imposed flow transformations (DRIFT); flow stress/response (FSR); and benchmarking.

Environmental flow: Refers to the amount of water needed in a watercourse to maintain healthy ecosystems. The term is used in the context of rivers which have been dammed, with most or all of the flow trapped by the dam — the failure to provide an environmental flow can have serious ecological consequences [source: Global Environmental Flows Network].

Environmental fund: An environmental fund may be created at any level of government to help finance prioritized environmental protection activities. It is ordinarily legally authorized concurrently with the authorization of incentive systems designed to stimulate innovative approaches to environmental management, such as pollution and water use fee systems to stimulate cleaner production and water conservation, respectively. The fund is a depository for revenues received from the incentive programs, such as environmental fee and charge programs, as well as other sources of receipts, such as fines and penalties from enforcement, government budgets, commercial banks, and international donor agencies. Disbursements from the fund follow carefully constructed guidelines to ensure compliance with the purposes of the fund and transparency. Disbursements may take many forms but typically include low-interest loans, loan guarantees, interest subsidies, and, in some cases, grants to assist recipients in financing cleaner technologies. Fund disbursements may also include recovery of the operating costs of the fund, the incentive programs, and/or the implementation of the regulatory framework (monitoring, permitting, and compliance assurance and enforcement). They also may be used to leverage capital markets to secure large loans for the construction, for example, of centralized treatment plants to benefit multiple users. Environmental funds are usually established as revolving funds in order to preserve the corpus for further environmental improvement, consistent with the fund's purposes. The authorizing law should recognize that the revenues derived from the fund are to be earmarked for fund purposes and not deposited in the government treasury for general use. Often, as is the case in Armenia, national laws prohibit special funds and their presence constrains an environmental fund's optimal effectiveness. Armenia's law in this respect requires amendment to accommodate this concept. An environmental fund's chief purpose to provide funding can play a particularly important role in the early phases of implementing a National Water Program (NWP) for Armenia. In this connection, an environmental fund could be constructed to serve the water sector only, for example to finance the improvement essential to water resources management needs: water resources monitoring, water use permitting, and compliance assurance with permit conditions and regulations. Such a "water fund" can be considered as a pilot project for Armenia, and, as experience is gained, be expanded to cover other water and environmental needs.

Equitable: The delivery of equity usually means making recipients of water 'more equal'. Where the application of equity results in farmers getting just a small quantity of water, that can't be used efficiently, the end result can be gross inefficiency. The details of how equity and efficiency trade-off needs to be understood and explained by policy makers.

Equity: Equal opportunity or access to the use of a resource and benefits to be derived from the use of a resource. Often used mistakenly to refer to protecting the vested interest of groups with relative greater economic, social, and political influence. Sometimes confused with the concept of fairness, which refers to the proportional distribution of benefits and costs of resource use.

Eutrophication: The process by which water becomes enriched with plant nutrients, most commonly phosphorous and nitrogen, which cause increases in plant and algal growth. Such increases reduce clarity and the availability of oxygen for other organisms.

During eutrophication, a lake or reservoir may become so rich in nutritive compounds that algae and other microscopic plant life become superabundant, decreasing oxygen for other aquatic life and thereby «choking» the lake or reservoir.

Evaluation: The systematic assessment of the relevance, implementation efficiency, development impact, and the expected outcome of a policy, strategy or plan.

Evaporation: The process by which water is changed from liquid to vapour.

Evapotranspiration: The loss of water to the atmosphere by evaporation from land and water surfaces and transpiration from plants.

Externalities: A secondary or unexpected consequence, often measured in an economic sense in terms of impacts.

Financial Incentives: Financial incentives are subsidies paid to those who undertake environmental protection projects. For example, a subsidy can be paid to an industrial enterprise that wishes to invest in modern and clean production technology or pollution control and abatement measures in order to comply with conditions described in its water use permit. Incentives such as grants, soft loans or other forms of subsidies, reduce the costs incurred for the project. They thus reduce any adverse impacts on the receiver's financial performance or provide an incentive for a receiver (for example an industrial enterprise) to undertake the project.

Financial viability: The capacity for an enterprise to remain 'viable' because it establishes a relationship between incomings (from sales) and outgoings (costs) that gives all factors of production (including capital) a return equal to or better than the opportunity returns elsewhere. In the short term, a business can remain in place (and thereby appear viable) by just covering its variable costs. In the longer term, however, when capital equipment has to be replaced, and all factors of production rewarded, it is necessary to cover all costs and make a profit.

Financial: Refers to expenditures, budgets and monies spent on water resources management.

Fines and penalties: Fines are an administrative legal instrument to encourage proper environmental behaviour. When fines are not paid, a legal action can be taken in accordance with civil or criminal law, which may result in imposing material and/or criminal penalties.

Fixed cost: Fixed costs are those costs that do not vary in proportion to output. If DoWR has less water to sell in a given year, there might be slightly lower labour costs associated with monitoring water applications but most costs will be the same as they would be in an average year.

Floodplain: Land area subject to inundation by flood waters from a river, water-course, lake, or coastal waters. Floodplains are delineated according to their estimated frequency of flooding.

Formal entitlements: Entitlements supported by a legally drafted and signed document that indicates the holder's rights regarding ongoing access to a regulated or supplementary supply of water.

Framework: The structure, outline or agenda for thinking about water resources management; a set of ideas, principles, agreements, or rules that provides the basis or outline for something intended to be more fully developed at a later stage.

Full cost accounting: An economic tool which takes into account the externalities involved in the production, use, and disposal of goods and services over time. Externalities are given prices to reflect their costs, including energy sources used, the environmental damage caused by the production, and the costs of disposal or recycling when the product is no longer usable. Natural or renewable resources, traditionally viewed as "free goods," are redefined as assets, having substantial value to an enterprise and being appropriately allocated in the calculation of profit and loss.

Function: An action or use for which something is suited or designed e.g. "the function of this reservoir is to collect and store water".

Good governance: Procedures are in place to ensure your transboundary water organization is free of corrupt practices in fiscal management, reporting and water sharing.

Governance: The range of political, social, economic and administrative systems that are in place (or need to be in place) to develop and manage water resources and the delivery of water services, at different levels of society (source: GWP).

Government utilities: These are government departments or agencies that sell real products to customers, whether as a retailer or wholesaler. The 'utilities' typically sold by government agencies include water, electricity and sanitation.

Green tax: A levy, duty or toll established by governments to pay for environmental activities.

Ground Water: Water beneath the surface of the ground, whether or not flowing through known and definite channels.

Growth: Expansion or increase in scale, magnitude, or physical dimensions.

Human system: Any part of the natural system which has been modified structurally for human economic or residential uses.

Hydraulics: The study of the physical behaviour of water in terms of its flow paths, velocities, and stages. Surface water hydraulics are basically controlled by relatively few parameters, some of which have so far only been estimated by empirical methods. These are: slope, surface roughness, depth of flow, channel shape and size, and sediment load. Each of these parameters is interrelated, so that the effect of slope is generally measured while holding the other parameters constant, and so forth.

Hydrology: The study of the spatial and temporal changes in water volumes and discharge rates, and in its broadest interpretation includes the physical and dynamic properties of water, water quality, and many aspects of climatology and geology. Hydrologic parameters of importance to floodplain management are more limited, including: flood peak flows; flood volumes; time of concentration and travel; rate of rise; water velocities; sedimentation and degradation of flood channels and floodplains; flood elevation; the effect of geomorphology on floods; the hydraulics of flood channels, floodplains, and man-made structures; and water quality as it is impacted by floods.

Impact assessment procedures: studies of the potential future effects of resource development on other resources and on social, economic and/or environmental conditions. Tools such as Environmental Impact Assessment, Strategic Environmental Assessment, Cost Benefit Analyses and Operational Assessments support the management of threats to sustainable water use (e.g. from infrastructure construction, over-abstraction, point-source and diffuse pollution and habitat loss/degradation). See Table 8.1 in this Training Manual for definitions of different types of Impact Assessment

Instream flow needs: Use of water taking place within the stream channel (in-stream use) for such purposes as fish and aquatic life propagation, recreation, water quality improvement, hydropower generation, navigation, and environmental protection.

Incentive: A positive influence which motivates action; it could a financial (pay money encourage action) or non-financial

Incorporation: The process of registering a business. Pani Panchayats wanting to take responsibility for O&M within their command area will need to put in place some corporate structure for collecting and dispensing funds. A limited liability company owned and controlled by members will be the easiest way of doing this; the company structure will allow farmers to undertake many beneficial functions as a group.

Infiltration: The movement of water through the soil surface into the soil under the forces of gravity and capillarity action, or the volume of water that passes into the soil profile over a unit area.

Infringement: A breach, violation or contravention of a law, rule or directive.

Institutional: A practice of a large water organisation, law or administrative system that is influential in the community, e.g. a national water resources department; institutions include policies, laws, regulations, financial incentives and subsidies, tariffs and other money raising activities.

Institutional arrangements: mechanisms of social order and cooperation governing the behaviour of a set of individuals or organizations in the water sector

Institutional roles: These refer to the functions and responsibilities of the institutions (government departments, laws, administrative systems) which deal with policy, regulations, implementation, execution and oversight understand and deliver as per their roles, and the institutional capacities they need to be effective. The GWP's IWRM Toolbox lists two broad categories of institutional tools: organisational frameworks and capacity building mechanisms - see www.gwptoolbox.org

Institutions: See institutional roles

Integrated catchment management plan: see 'Basin development and management plan'.

Integrated river basin management plan: see 'Basin development and management plan'.

Integrated Water Resources Management (IWRM): or Integrated Water Resources Planning and Management (IWRP&M) is a structured process that is well conceived and defined, and very creative. It is a method for the management, regulation, conservation and utilization of water and related land resources in an orderly and coordinated manner. Formal definitions vary but all focus on inter-sectoral coordination, stakeholder involvement and intergenerational equity. Here is a sample of some definitions:

- "A process of formulating and implementing a course of action involving natural and human resources in an ecosystem, taking into account the social, political, economic and institutional factors operating within the ecosystem in order to achieve specific societal objectives." (Dixon and Easter 1986)
- "The coordinated management of land and water resources within a river basin, with the objectives of controlling and/or conserving the water resource, ensuring biodiversity, minimizing land degradation, and achieving specified and agreed land and water management, and social objectives. (Hooper 1997)
- "A process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems." (Technical Committee of the Global Water Partnership, 2000)

This methodology provides for due consideration of all water and related land resources concurrently, including surface waters and ground waters, in the process of conserving these resources, and exploiting these resources in the solution of problems and the satisfaction of clearly identified and defined needs. The application of these physical resources, and also human and financial resources, to the resolution of inter-sectorial and competing needs, in accordance with defined criteria, represents the essence of IWRP&M. It is a "holistic" approach in which all legitimate claims on resources-use and management are given due consideration, in advance of investment and exploitation. Equity in the application of resources to the benefit of those to whom these resources pertain, in accordance with appropriately established principles, goals, objectives, standards and criteria, is one of the key aspects of IWRP&M.

The management of these physical resources on the basis of natural boundaries defined by the river basin rather than political or administrative boundaries is a more rational and viable approach. The process of integrated water resources planning and management requires public education, public awareness, and public participation, so that decisions regarding the conservation and utilization of natural resources reflect the public interest and the public will. This results in the development of plans that have public support, in addition to sound technical, economic, financial, environmental, and social foundations. Public support is also

necessary in order to establish "willingness-to-pay". The application of IWRP&M requires the proper institutional framework. The appropriate institutional setting for undertaking IWRP&M is deserving of considerable and purposeful investigation and effort to assure that objectives can be achieved most efficiently. Thus, four elements are necessary for successful integrated water resources planning and management:

- The application of proper methodology;
- The proper institutional setting;
- The framework of natural river basin boundaries; and
- Public participation

Integration: The act of combining into a coordinated whole.

Involvement: Participation in a water resources management activity.

Irrigation: The application of water by artificial means. The goals of irrigation include, but are not limited to, supplying evapotranspiration needs, field preparation, freeze protection, crop cooling, and leaching of salts.

Jurisdiction: Defined area or jurisprudence over which an authority or agency has responsibilities or influence.

Legal instruments: They comprise direct regulations coupled with systems of monitoring and compliance assurance, and the sanctioning of non-compliance. They are often combined with financial enforcement incentives, such as fines and penalties. Traditionally, Governments have used legal instruments in a command and control approach to manage water demand. A water use permit is an example of a legal instrument.

Legislation: Refers to the laws operating in a country; the act of making or enacting laws.

Levee: An embankment to prevent flooding, or a continuous dike or ridge for confining the irrigation areas of land to be flooded.

Logistical: Referring to the method(s) by which an activity takes place.

Lowest appropriate level (principle of subsidiarily): an organizing principle which maintains that matters ought to be handled by the smallest, lowest or least centralized competent authority; for example, in the water sector this could be a local water user district.

Main stem (mainstem, mainstream): refers to the main, central course of a river.

Management instruments: These are the elements and methods that enable and help decision-makers make rational and informed choices between alternative actions. These include a wide range of methods, both quantitative and qualitative, based on disciplines such as hydrology, hydraulics, environmental sciences, system engineering, legal sciences, sociology and economics. To make progress in IWRM it is necessary to select the group of instruments that best suit a specific reality, considering the existing social and political consensus, available resources, and geographical, social and economic contexts; and applying them properly. As a decision-maker, you need to know which management instruments are in use, and the experiences and lessons that have been acquired after applying these instruments on different realities, so that it is possible to select best options while adapting to local conditions. The GWP's IWRM Toolbox lists many management instruments - see www.gwptoolbox.org

Manipulative: Scheming, calculating or controlling.

Marginal cost: The cost associated solely with each additional unit of production or consumption.

Market-based instruments: see Economic instruments

Measure: An activity that is in line with the strategy chosen and which contributes immediately or in the longer term to the achievement of the (policy) objective(s).

Memorandum: A written statement summarizing the terms of a contract or a similar legal transaction; a memorandum refers to an agreement for joint action.

Micro-economic reforms: These refer to substantial changes in markets, particularly those controlled by government. The primary purpose of micro-economic reform applied to government utilities is to make them perform and behave more like firms subject to competition. Cost recovery is often the initial focus of micro economic reform.

Minimum flow requirements: The minimum water flows in rivers to maintain several essential functions including aesthetics, fish production, human health and the maintenance of an overall healthy water ecosystem. During Soviet times, Armenia established a system and models for calculating minimum flow requirements in rivers. The calculation method is described in "Guidelines for Regulating Minimal Water Flow in Rivers for Nature Protection". The application of the guidelines result in minimum flows (in m3/s) in one point along each river, far downstream in the basins, with no regards to the flow in the rivers upstream of this point.

Minimum flows and levels: The limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area.

Monitoring: Monitoring is the systematic and continuous collection and processing of data for planning, enforcement, and decision-making purposes.

National water policy: An outline of objectives and general directions for the development and management of the country's water resources, based on certain fundamental principles and national law. The Armenian Water Code defines the national water policy as a concept of perspective development of strategic use and protection of water resources and water systems.

National Water Program: In general, a National Water Program describes the strategies and measures to achieve certain (policy) objectives. The Program also provides a schedule for the implementation of these measures, assigns responsibilities for their implementation, and describes how the implementation will be financed. In addition, the National Water Program could provide instructions and guidelines for the preparation of the development of river basin plans. The national strategies and measures will have to be reflected in river basin plans, although the actual formulation of the basin plans should be more related to specific issues and conditions. The National Water Program is generally prepared on the basis of national policy documents or plans prepared by the water using sectors (irrigation, environment, municipal water supply, etc.), a national policy document for spatial planning, and other documents that look into the future of the various economic sectors.

National Water Reserve: The Armenian Water Code defines the National Water Reserve as the quantity of water needed to preserve aquatic ecosystems and basic human needs of present and future generations. The water requirements related to preservation of water ecosystems refer to aspects of water quality and water level of Lake Sevan (and associated wetlands) and to the minimum flow requirements in rivers.

Non-consumptive allowance: This refers to an allowance of water that should not be extracted from the river or storage. Thus environmental flow can be referred to as 'the non-consumptive allowance'.

Non-profit (not for profit) organisation: A social structure in which people for together and which does not earn any financial benefit over expenses, of if benefits accrue, they are returned to the organisation for research and development or further actions.

Organisation: A social structure in which people work together.

Organisational mapping: A procedure to list the social structures in a specific place (local area, region, nation) and describe their roles and responsibilities.

Outstanding issue: An item of overwhelming importance e.g. the outstanding issues in the lower Ganges River floodplains are poverty and flood damages.

Paraphrasing: To restate something using other words, especially in order to make it simpler or shorter.

Participation: Process through which stakeholders influence and share control; being involved to some extent.

Permeability: The ability of a rock or sediment to transmit fluid.

PIM (Participatory Irrigation Management): refers to programs that seek to increase farmer's direct involvement in system management – either as a complement or a substitute for the state role.

Plan: A more detailed outlining of the measures that have to be implemented to operationalize a certain strategy. Any plan should be practical and technically and financially feasible.

Policy: A statement of guiding principles and course for action; a programme of actions adopted by a person, group, or government, or the set of principles on which they are based.

Potable Water: Water that is suitable for drinking, culinary, or domestic purposes. The maximum chloride concentration is 250 mg/l.

Price signal: Often expressed in terms of clarity. Prices that go up and down rapidly or are difficult to discern are said to be 'confused'. But if the price of water was to trend upward it could be taken as a 'clear signal' that demand has increased and superior water use and allocation measures should be attempted. Clear price signals provide the basis for decisive action.

Price: The rate resulting from the conjunction of supply and demand applying to a product (output) or factor of production (input). Price in this context is usually expressed relative to some unit such as Rs/Ml of water.

Probing: Inquiring, questioning.

Property rights: The rights (implicit or explicit) help by users in relation to real property such as land or water. Property rights with respect to water will refer to such dimensions as access (e.g., when and where), quantity (e.g., a volume or equivalent amount), reliability (e.g., low, high or a % of a specified amount), quality (e.g., potable, suitable for livestock or irrigation, hazardous, etc.). Property rights might also refer to the conditions under which real property can be traded or exchanged.

Public goods: Assets owned by all people in a nation e.g. the assets of this country include clean water.

Raw water: Water that has not received any man-made treatment.

Reasonable/beneficial use: The use of water in such quantity as is necessary for economic and efficient utilization for a purpose and in a manner which is both reasonable and consistent with the public interest.

Reclaimed water: Water that has received at least secondary treatment and is reused after flowing out of a wastewater treatment facility.

Reforms: Actions to change and improve something by correcting faults, removing inconsistencies and abuses, and imposing modern methods or values.

Reservoir: A manmade or natural lake where water is stored.

Resilience: The ability of a natural system to recover from or adapt to the stresses being placed upon it.

Responsibility: The state, fact, or position of being accountable to somebody or for something.

Restoration: To recover the natural system's vitality and biological and hydrologic integrity in such a way that the stated levels of health and ecological function are maintained over time.

Reuse: The deliberate application of reclaimed water, in compliance with FDEP and Water Management District rules, for a beneficial purpose.

Riparian: in the case of transboundary water management, this refers to a country which contains an international river, lake or aquifer.

Robust M&E process: A strong, useful and effective activity which includes both monitoring (checks something at regular

intervals in order to find out how it is progressing or developing) and evaluation (the act of considering or examining something in order to judge its value, quality, importance, extent, or condition).

Safe annual yield: The reliability of water sourced from surface storages can be expressed in terms of 'safe annual yield' and will be of great interest to downstream water users – especially during those months of the year when natural water supplies are most stressed. The 'safe' dimension of yield will take into account the key sources of variability; principally monsoon behaviour, size and efficacy of the catchment and siltation of the dam itself.

Saline Water: Water with a chloride concentration greater than 250 mg/l. The term saline water includes brackish water and seawater.

Scenario: An outline or synopsis of a water resources project, or plan, or impact of an action.

Scoping (as in impact assessment): The range of influence covered by an activity, subject, or topic.

Sectoral: Pertaining to a distinct subset of a market, society, industry, or economy, whose components share similar characteristics; examples include the water sector, the food sector, the environmental sector, the energy sector.

Self mobilization: Participation by taking action.

Social mapping: An activity which charts and records the range of players (stakeholders) and their interests and activities in a water resources management setting.

Stake: A bargaining position a person holds in a water decision.

Stakeholder: (i) A person or an organisation with an interest in water resources management or water-related development; or (ii) a person or an organisation likely to be affected, positively or negatively, by a planned.

Stormwater: Surface water resulting from rainfall that does not percolate into the ground or evaporate.

Strategic Water Reserve: A water body that can be used for the provision of essential water supply services during dry seasons or a series of dry years. For example, the main strategic water reserve in Armenia is the storage in Lake Sevan above the outlet to the Hrazdan River. Another potential strategic reserve constitutes the country's deep groundwater resources.

Strategy: A strategy describes the ways and means to achieve a certain (policy) objective(s). A strategy could also provide a general description of the measures that should be implemented in order to achieve the objective(s). Some strategies don't need any policy guidance, as they are obvious, based on national and international experience or simply "common sense" in water sector development. Any strategy should be practical, realistic and fundable.

Sub-basin: Comprises the drainage basin of a tributary that discharges directly to the mainstream river.

Subsidiarity: The principle that political power should be exercised by the smallest or least central unit of government.

Subsidy: A grant or gift of money from a government to a private company, organization, or charity to help it to function; a monetary gift or contribution to somebody or something, especially to pay expenses.

Surface water management: The development and implementation of a combination of structural and non-structural measures intended to reconcile the water conveyance and storage function of depressions, lakes, swales, channels, floodplains, and coastal waters with the space and related needs of a designated area.

Surface Water: Water upon the surface of the earth, whether contained naturally or artificially. Water from natural springs is classified as surface water when it exits from the spring onto the earth's surface.

Sustainability: The state of having met the needs of the present without endangering the ability of future generations to be able to meet their own needs.

Sustainable community: A community which uses its resources to meet current needs while ensuring that adequate resources are available for future generations. Such a community seeks improved public health and better quality of life for all its residents by limiting waste, preventing pollution, maximizing conservation and promoting efficiency, and developing local resources to enhance the local economy.

Sustainable economic development: A qualitative change (improvement or degradation) of a physically non-growing economic system in a state of dynamic equilibrium maintained by its environment.

Tariff: Another term for price, charge or rate e.g., Rs/Ml of water. Pani Panchayats that take responsibility for their own O&M will determine member charges on any basis they see fit.

Total available water for development: In an Armenian context, total available water for development is defined as 'total available water minus total water use'.

Total available water: The total available water equals the annually renewable water resources (surface water and groundwater) in a country or a river basin.

Total useable water: In the context of Armenia, the total useable water equals the total available water resources minus the National Water Reserve. Total usable water can be allocated for consumptive use in the water using sectors (irrigation, industry, public water supply, hydropower, etc.) without reducing the National Water Reserve.

Total water use: Total water use equals the current "active " (consumptive) use of water resources in a country or river basin in water using sectors (irrigation, hydropower, industry, public water supply, etc.).

Trade-off: A situation in which somebody is prepared to compromise by giving up all or part of one thing in exchange for another.

Traditional plans (called 'Master Plans'): cover one sector (or theme) and are intended for implementation by one administrative body; but a basin development and management plan (see above) will span across sectors and include activities to be implemented by different agencies, in support of a shared overall water resources development and and/or management goal.

Transferability of entitlements: The capacity to transfer a water entitlement by trading between buyers and sellers. The terms and conditions attached to a water entitlement will indicate whether it can be transferred and under what conditions.

Typology: The study or systematic classification of types, groups, categories or classes.

Urban development: The human landscape characterized by cities, towns, suburbs, and outlying areas which are typically commercial, residential, and industrial in nature. They are typically non-agricultural or non-rural in nature.

Urban service area: The geographic extent or area to which urban utilities or services are provided or planned to be provided over a specific time frame.

User fees for natural resources: User fees require users of natural resources to pay a fee for the use of the resource. The most common example is the use or withdrawal of water. Since the resource is finite, a fee for its use encourages users to conserve it.

Value-added: The monetary worth contributed by labour to raw materials through the production process. Any process that adds value to products and final goods.

Variable cost: Those costs of production that vary in direct proportion to the volume of output.

Vulnerability: The degree to which a system is susceptible to, or unable to cope with, adverse effects of change, including system variability and extremes; in the water sector the hydrological extremes include flood and drought.

Wastewater: The combination of liquid and water-carried pollutants from residences, commercial buildings, industrial plants, and institutions together with any ground water, surface runoff or leachate that may be present.

Water allocation: A regulated withdrawal of water from a ground or surface source on the basis of total volume and/or rate of withdrawal. This term is also applied to designated amounts of storage in a reservoir, including the amount to be released to protect fisheries and recreational uses; an institutional device (policy, agreement, programme) used to share water between riparians.

Water budget: A description and quantification of the quality and movement of water in the hydrologic cycle within a specified geographic area. The product is often portrayed as a "balance sheet" of water in and water out in a dynamic system.

Water footprint: The impact of water use, usually measured in terms of volume per unit of time of a specific area (e.g. m3/year/km2); it is an indicator of water use that includes both direct and indirect water use of a consumer or producer.

Water market: The mechanisms that allow the relationship between water supply and demand to be revealed and converted into 'relevant actions'. A major component of supply will be the water plans and distribution systems applicable to basins, rivers, streams and storages that are integral to servicing the water needs of the population. Water demand should be expressed through prices and actions that different users are prepared to pay or take. Protests about water might reflect the inability of users to gain access to a market where they can buy and sell water products. Efficient interaction between supply and demand relies firstly in the existence of real or virtual markets and secondly on 'feeding' the market with relevant information.

Water protection zone: A territory established for preventing pollution, littering, depletion of water resources, as well as for provision of a favourable water regime, which is not subject to privatization and confiscation.

Water quality criteria: Numeric or narrative value designed to protect and support a designated use of a water body.

Water quality standards: Includes the designated uses, criteria and anti-degradation policy that define the water quality goals of a water resource.

Water standards: Qualitative and quantitative criteria and requirements for water resource (including the National Water Reserve) necessary for protection of water resources quantity and improvement of water resources quality.

Water table: That surface of a body of unconfined ground water at which the pressure is equal to the atmosphere; defined by the level at which water within an unconfined aquifer stands in a well that penetrates the aquifer far enough to hold standing water.

Water use: Any utilization of water which reduces the supply from which it is withdrawn or diverted.

Watershed: A region of land within which water flows down into a specified body, such as a river, lake, sea, or ocean; a drainage basin or catchment basin; the total area above a given point on a watercourse that contributes water to its flow; the entire region drained by a waterway or watercourse that drains into a lake, reservoir or bay.

Wetlands: Areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support and under normal circumstances do or would support, a prevalence of vegetative or aquatic life that require saturated or seasonally saturated soil conditions for growth and reproduction. These include swamps, marshes, bayheads, cypress ponds, sloughs, wet prairies, wet meadows, river overflows, mudflats, and natural ponds.

Whole of basin approach: a procedure which recognizes the river/lake or aquifer basin as an integrated ecological system in water management plans; specifically, this approach recognises that supplying adequate flows will not achieve environmental objectives unless

water quality, catchment land use, riparian overgrazing and other problems are addressed at the same time; see also 'Basin development and management plan'.

Wholesaler: When a state water agency sells water to a retailer (such as a Department of Public Health that sells water to urban households) then it is acting as a wholesaler. In the role of wholesaler, the state water manager is better positioned to focus on efficient storage and distribution and water planning.

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