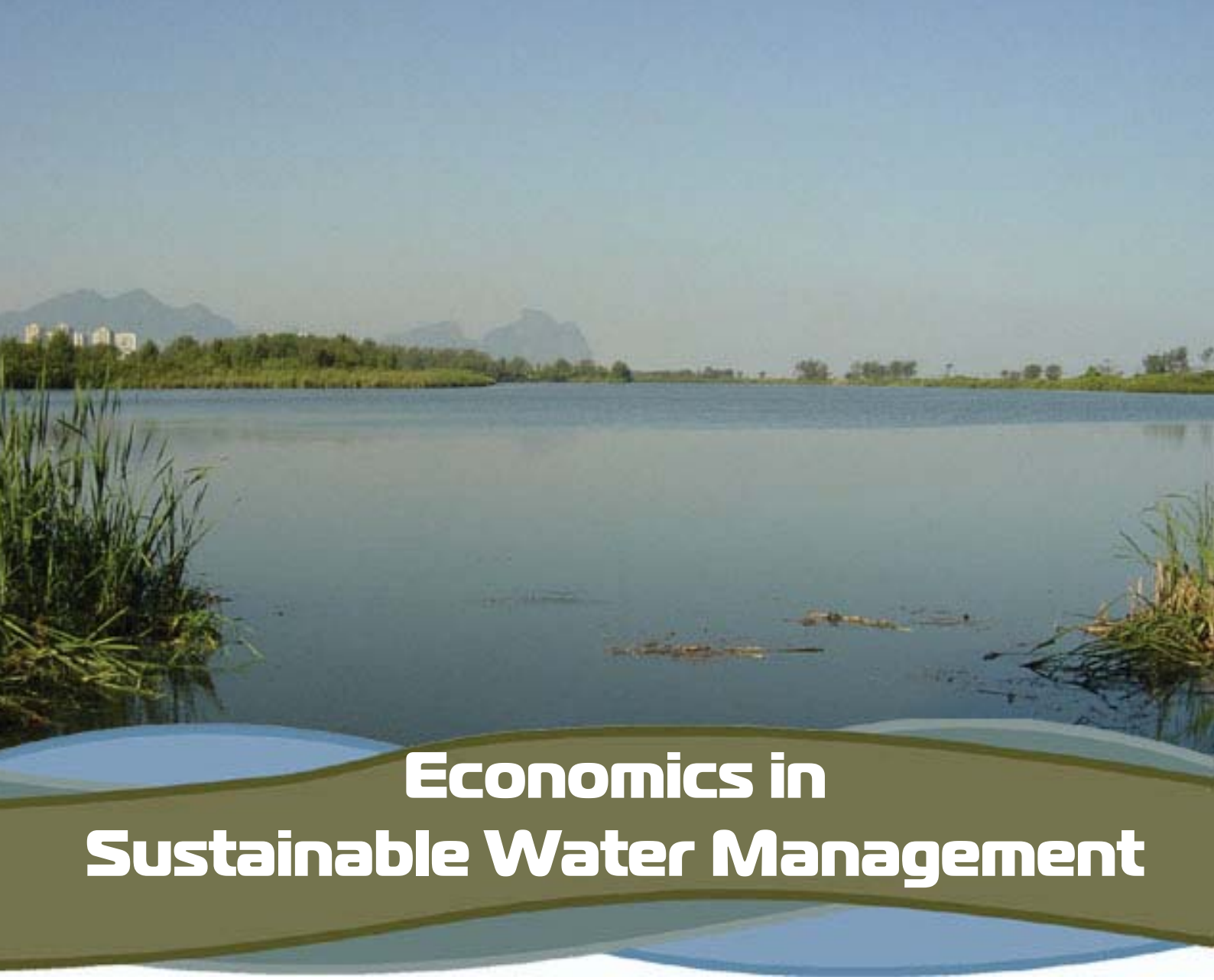

Economics in Sustainable Water Management

Training Manual and Facilitators' Guide

March 2008

Cap-Net UNDP

Global Water Partnership

EUWI EU WATER INITIATIVE Finance working group

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FOREWORD

Water is essential for life, development, health, and poverty alleviation. We live in a time where the world faces huge needs and challenges to ensure better access to safe water and sanitation service to billions of people. This has been rightly addressed in the Millennium Development Goals (MDGs) and many other global, regional, and local-level resolutions. There is general consensus that improved efficiency in the water sector, and the direct positive consequences that better water resources management and better access to water and sanitation, will bring to major development targets.

For better management and improved access, there are several tools and instruments available to the water manager. This training manual focuses on economic and financial instruments. Economic instruments provide incentives for more efficient water use, either in terms of reduction of water quantity or increasing returns on investment in water management and infrastructure. Financial tools are applied for financing water management and infrastructure, water sector reforms and planning for integrated management of the resource.

Water managers are expected to make rational water allocation decisions based on efficiency and effectiveness. It is within this context that Cap-Net, the Global Water Partnership (GWP), and the European Union Water Initiative Finance Working Group (EUWI-FWG) have joined efforts to develop this training manual on economic and financial instruments for IWRM. The need for the manual is evidenced by the many training courses that have been organised, following on from an international training of trainers' workshop held in Mexico in May 2007 and organised by Cap-Net and its partner networks. It is our aspiration that the manual would find its way to those capacity builders on the ground who intend to organise training activities on economics in sustainable Water Management (IWRM) and who may find inspiration and guidance from it.

March 2008

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PART 1

Training Manual

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PART 1: TRAINING MANUAL

Disclaimer

This document has been produced with the financial assistance of the European Union.

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INTRODUCTION

This training manual and facilitator's guide aims to assist capacity builders to conduct short training courses on economic and financial instruments for integrated water resources management. The target audience for such trainings are water managers who face water allocation decisions and aim for efficient and effective use of the resource. However, the manual and guide is also suitable for use in educational programmes and for awareness-building actions. It is therefore encouraged to adapt it to the regional or country water management context and the public targeted. The structure of the manual and supporting materials on CD should allow for such adaptations.

The present document is structured in two main sections: the Training Manual and the Facilitators' Guide. The manual provides the concepts and principles of economic and financial aspects of sustainable water management and, at the same time, the practical application of economic and financial tools and instruments. It strongly makes a case for consideration of these aspects within the context of integrated management of the resource. To this purpose, it is structured in eight chapters that address the following:

- Introduction to integrated water resources management
- From water-related issues to economic and financial instruments
- Introduction to economic instruments
- Application of water economic instruments
- Introduction to water finance
- Application of financial tools
- Financing water and sanitation through bonds, BOTs and reforms
- Local financing mechanisms for WASH services delivery

The goals and learning objectives are specified at the beginning of each chapter and reflection statements and questions are provided throughout the document.

The facilitator's guide for facilitators (Section 2 of this document) provides the capacity builder with some practical guidance for the organisation and conduct of courses on the subject. It has session outlines for each of the chapters as well as tips and suggestions for the organisation of the course and for moderation and innovative learning. The guide includes suggestions for the materials to be used in the sessions, the length and organisation of the sessions, exercises and interactive sessions, and energisers that can be used throughout the course. It also includes reference to useful resources and websites. A sample course programme for a five-day training course is provided to help structuring the course.

Supporting materials provided on the accompanying CD include easily adaptable presentations for each of the sessions, resource materials that can be used at the training or as useful background reading, and references and case studies. The CD also contains the training manual in digital format.

Although the manual can be read and used as a stand-alone document, experiences brought in and discussions between participants in a course have proven to be very enriching and instrumental in grasping the subjects being addressed. It is intended that the manual be used to stimulate interactions between participants that will result in better understanding of the use and usefulness of economic and financial instruments for sustainable water management.

This document is also available on the Cap-Net web site:

www.cap-net.org > databases > training materials

CHAPTER 1
INTRODUCTION TO INTEGRATED WATER RESOURCES MANAGEMENT

Goal

The goal of this chapter is to introduce the concept of integrated water resources management (IWRM), its principles, the importance of economic and financial instruments in achieving IWRM, and to provide a preliminary overview of the challenges in implementing IWRM.

Learning objectives

At the end of this session, participants will:

- Be able to describe the meaning of IWRM and its main principles;
- Understand the main reasons for taking an IWRM approach;
- Understand the importance of economic and financial instruments in IWRM; and
- Be able to describe the main challenges in implementing an IWRM strategy in their country.

1.1 Introduction

Water sustains life and is therefore a basic human need and right without which human beings will not survive. A minimum of 20 to 40 litres of water per day per person is needed for drinking and basic hygiene. However, the world's freshwater resources face increasing demands from population growth, economic activity and, in some countries, improved standards of living. Competing demands and conflicts over rights of access occur amidst the fact that many people still do not have equal access to water and sanitation. It has been described as an impending water crisis. According to the United Nations, access to safe drinking water and basic sanitation is essential for the achievement of the Millennium Development Goals (MDGs) (UN, 2006). It is a fundamental requirement for effective primary health care and a pre-condition for success in fighting poverty, hunger, child mortality, gender inequality and environmental damage.

Here are a few reasons why many people argue that the world faces an impending water crisis, as summarised in Box 1.1:

Box 1.1: Water crisis – Facts

- 1.1 billion people still do not have safe water supplies.
- Today, more than 2 billion people are affected by water shortages in over 40 countries.
- Four out of ten people around the world still use very basic sanitation facilities.
- Two million tonnes per day of human waste are deposited in watercourses.
- Each year, unsafe water and a lack of basic sanitation kill at least 1.6 million children below the age of five years.
- Half the population of the developing world are exposed to polluted sources of water that increase the incidence of disease.
- 90% of natural disasters in the 1990s were water related.
- The increase in numbers of people from 6 billion to 9 billion will be the main driver of water resources management for the next 50 years.

Cap-Net's tutorial on Basic Principles on Integrated Water Resources Management notes that:

- Water resources are increasingly under pressure from population growth, economic activity and intensifying competition among users;
- Water withdrawals have increased more than twice as fast as population growth and currently, one third of the world's population live in countries that experience medium to high water stress;
- Pollution is further enhancing water scarcity by reducing water usability downstream;
- Shortcomings in the management of water, a focus on developing new sources rather than managing existing ones better, and top-down sector approaches to water management result in uncoordinated development and management of the resource.
- More and more development means greater impacts on the environment.
- Current concerns about climate variability and climate change demand improved management of water resources to cope with more intense floods and droughts.

This impending water crisis presents challenges to the water sector. Current challenges faced by the water sector are multi-faceted in that they include: *How can*

Box 1.2: Challenges and solutions

Improving access to water can be difficult because responsibility for water resources management is usually spread across many different parts of the government in developing countries. No single government department can take the lead, as they often have conflicting views. For example, agricultural departments are usually more interested in promoting irrigation and food production, while other ministries will be more interested in improving the supply of drinking water and sanitation. Today, more than 2 billion people are affected by water shortages in over 40 countries.

To improve access to water and sanitation, there will need to be:

- Commitment from developing country governments to make it much more of a priority;
- Appropriate long-term financing;
- Arrangements in place to resolve the competing demands for water and other related environmental challenges;
- Increased advocacy on behalf of poor people to ensure that their demands are heard;
- Improved capacity of governments to facilitate delivery or deliver services to all citizens; and
- Improved responsiveness and accountability of government to meet the needs of all users, but especially meet poor people's needs.
- resources management for the next 50 years.

Source: Adapted from Department for International Development (DFID), 2006

people have access to water and sanitation?; *How can competition among various users be addressed without undermining economic growth objectives?*; and *How can the protection of vital ecosystems be ensured?*. Failure to meet these complex challenges pushes societies further away from meeting the goal of sustainable development, and sustainable management and development of water resources in particular.

There is much ongoing debate that integrated water resources management can meet these challenges. See Box 1.2.

1.2 What is Integrated Water Resources Management?

Integrated water resources management may be defined as a systematic process for the sustainable development, allocation and monitoring of water resource use in the context of social, economic and environmental objectives (Cap-Net, 2006). It is cross-sectoral and therefore in stark contrast to the traditional sectoral approach that has been adopted by many countries. It has been further broadened to incorporate participatory decision making of all stakeholders.

IWRM is a paradigm shift. It departs from traditional approaches in three ways:

- The multiple goals and objectives are crosscutting so that IWRM departs from the traditional *sectoral* approach.
- *Spatial* focus is the river basin instead of single water courses;
- Departure from narrow professional and political boundaries and perspectives and broadened to incorporate participatory decision making of *all* stakeholders (*Inclusion versus exclusion*)

The basis of IWRM is that there are a variety of uses of water resources which are interdependent. The failure to recognise interdependency coupled with unregulated use can lead to negative consequences of water resource wastage and in the long term to the unsustainability of water resources.

Box 1.3: Interdependency and need for IWRM

High irrigation demands and river pollution from agriculture reduce available freshwater for drinking or industrial use; contaminated municipal and industrial wastewater pollutes rivers and threatens ecosystems; if water has to be left in a river to protect fisheries and ecosystems, less can be diverted to grow crops. This interdependency of water uses is recognised in IWRM.

Source: Cap-Net 2006

Question from the ground

Could you give examples from your own country where this interdependency of water uses exists?

Integrated management does not segregate water users or use a sectoral approach as is adopted in many countries. Rather, water allocation and management decisions consider the impact of each use on the other. In so doing, the crosscutting goals of social, economic and environmental sustainability are considered collectively, and cross-sectoral policies are examined to shape more coherent, coordinated policies. In short, IWRM recognises that water is a scarce natural resource, subject to many interdependencies in conveyance and use.

The basic IWRM concept has been extended to incorporate participatory decision making and will be discussed in more detail in section 1.4, which deals with water management principles.

Different user groups (farmers, communities, environmentalists, and others) may influence strategies for water resource development and management. That brings additional benefits, as informed users apply local self-regulation in relation to issues such as water conservation and catchments protection far more effectively than central regulation and surveillance can achieve.

The term **management** is used in its broadest sense in that it highlights the need to not only focus on the development of water resources, but also consciously manage water development that ensures sustainable use for future generations (Cap-Net, GWP, 2005).

1.3 Water Management Framework

Integrated water resources management occurs in a holistic framework, dealing with (Jaspers, F; 2001):

- all water (spatial);
- all interests (social);
- all stakeholders (participatory);
- all levels (administrative);
- all relevant disciplines (organisational);
- sustainability (in all senses: environmental, political, social, cultural, economic, financial and legal).

The framework is so broad, that the aim of IWRM is to discard from sector approaches and to create environmental, institutional, social, technical, and financial sustainability through the creation of a *platform* for government and stakeholders for planning and implementation, and to deal with conflicts of interests.

At the core of the water management framework is the treatment of water as an economic good as well as a social good, combined with decentralised management and delivery structures, greater reliance on pricing, and fuller participation by stakeholders (World Bank, 1993). All of these principles and issues will be discussed in more detail in the following section (1.4).

What will a Water Management Framework do?

1) Provide a framework for analysing policies and options that will guide decisions about managing water resources in relation to:

   - Water scarcity;
   - Service efficiency;
   - Water allocation; and
   - Environmental protection

2) Facilitate consideration of relationships between the ecosystem and socio-economic activities in river basins.

The analysis should take account of social, environmental, and economic objectives; evaluate the status of water resources within each basin; and assess the level and composition of projected demand. Special attention should be given to the views of all stakeholders, which should take place through activities designed to facilitate participation. Section 1.4 provides details on Principle 2 of the Dublin Principles, which highlight the benefits and challenges in attaining participation. Box 1.4 also indicates how participation can be operationalised by using consultative mechanisms, awareness building and education.

Stakeholder participation essentially involves four steps:

1. Identify the key stakeholders from the large array of groups and individuals that could potentially affect, or be affected by, changes in water management;
2. Assess stakeholder interests and the potential impact of the IWRM planning on these interests;
3. Assess the influence and importance of the identified stakeholders; and
4. Outline a stakeholder participation strategy (a plan to involve the stakeholders in different stages of the plan preparation)

The results of the analyses at a river basin level would become part of the national strategy for water resources management. The analytical framework would provide the underpinnings for formulating public policies on regulations, incentives, public investment plans, environmental management, and the linkages among them. A supportive legal framework and adequate regulatory capacity are required, as well as a system of water charges to endow water entities with operational autonomy and some financial autonomy for efficient and sustainable service delivery.

1.4 Water Management Principles

A decade and a half ago (at the International Conference on Water and the Environment, convened in Dublin, Ireland, in 1992), four main principles of water emerged that have become the cornerstones of subsequent water sector reform.

Principle 1: ***Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment.***

Principle 1 highlights that water is critical to sustaining life. However, freshwater is a finite resource because the hydrological cycle on average yields a fixed quantity of water per period, and the quantity of water resources cannot be adjusted significantly by human actions. Furthermore, as a resource, water is paradoxically vulnerable to development and essential to development. Effective management of water resources, which seeks to ensure that the services that are in demand can be provided and sustained over time, requires a holistic approach that links social and economic development with the protection of natural ecosystems. Effective management does not dichotomise land and water uses, but sees the integration of these uses across the whole of a catchment area or river basin.

The integrated approach to management of water resources necessitates coordination of the range of human activities that create the demands for water, determine land uses and generate waterborne waste products. The principle also recognises the catchment area or river basin as the logical unit for water resources management.

Principle 2: ***Water development and management should be based on a participatory approach, involving users, planners and policymakers at all levels.***

Where water is concerned, everyone is a stakeholder. Accordingly, water development and management should be based on a participatory approach which draws on the principle of a democratisation of decision making, and gives recognition to the input of multiple stakeholders including users, planners and policymakers at all levels.

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, water management and water use choices. Participation also occurs if democratically elected or otherwise accountable agencies or spokespersons can represent stakeholder groups; but even in this situation, access to information, consultation processes and opportunities to participate should also be there.

Benefits of Participation:

- Participation emphasises involvement in decision making at the most feasible level (subsidiarity), with full public consultation and input from users in the planning and implementation of water projects, which leads to more successful projects in terms of scale design and operation and maintenance;
- Participation also helps to ensure that environmental resources are protected and that cultural values and human rights are respected;
- Participation can help coordinate interests, increase transparency and accountability in decision making; and
- Greater participation can also improve cost recovery, which is key to revenue generation and financing IWRM.

Box 1.4: Participation is more than consultation.

Participation requires that stakeholders at all levels of the social structure have an impact on decisions at different levels of water management. Consultative mechanisms, ranging from questionnaires to stakeholder meetings, will not allow real participation if they are merely employed to legitimise decisions already made to defuse political opposition or to delay the implementation of measures that could adversely impinge upon a powerful interest group.

Participation will not always achieve consensus. Arbitration processes or other conflict resolution mechanisms will also need to be put in place.

Participatory capacity needs to be created, particularly amongst women and other marginalised social groups. This may not only involve awareness raising, confidence building and education, but also the provision of the economic resources needed to facilitate participation and the establishment of good and transparent sources of information. It has to be recognised that simply creating participatory opportunities will do nothing for currently disadvantaged groups, unless their capacity to participate is enhanced.

Box 1.5: Determinants, Conditions for Effective Participation, and Challenges

As noted, real participation occurs only when stakeholders are actually part of the decision-making process. However, there are determinants, conditions and challenges related to participation in most countries.

Determinants of the types of participation and conditions for effective participation

- The type of participation depends on the *spatial scale* (river basin or village water system) relevant to the particular water management and investment decision.
- The nature of the political environment in which decisions take place

Challenges to the participatory approach

Participation does not always achieve consensus as the following challenges reveal:

- Arbitration processes and other conflict resolution mechanisms are sometimes needed.
- Government intervention is sometimes needed to create an enabling environment for marginalised social groups such as the poor, indigenous people, the elderly, and women.
- Opportunities for participation are insufficient to provide the gains of the participatory approach. Currently, disadvantaged groups must also have the capacity to participate. Capacity building to enhance participation of disadvantaged groups is important.

Source: Cap-Net, 2006.

Principle 3: ***Women play a central part in the provision, management and safeguarding of water.***

Question from the ground

In your country, are all stakeholders involved in decision making on water supply, management and investment decisions?

It is widely acknowledged that women play a key role in the collection and safeguarding of water for domestic use, and in many countries agricultural use. However, women are less instrumental than men in key areas like management, problem analysis and the decision-making processes related to water resources. Oftentimes, the marginalised role of women in water resources management can be traced to social and cultural traditions, which also vary between societies.

There is strong evidence that water managers must consider that there is an urgent need to mainstream gender in integrated water resources management to achieve the goal of sustainable water use. Cap-Net and the Gender and Water Alliance (GWA) developed a tutorial for water managers in which is explained "Why Gender Matters". Some parts of the tutorial are covered in this section, but the manual users are advised to review the tutorial for a more complete understanding of the importance of having a gender-balanced approach in IWRM.

Basic linkages between gender and IWRM

There are three basic linkages between gender and IWRM issues, which are discussed in the following sub-sections:

1) Gender and environmental sustainability linkages

- Women and men reduce environmental sustainability in different proportions and by different means, as they have different access, control and interests.
- Flood and drought events weigh heaviest on women because they lack the means to cope with disasters.

2) Gender and economic efficiency linkages

- In many societies, women pay for drinking water but have mobility restrictions and payment constraints. Allowing users to pay smaller amounts more frequently and nearer to home makes water more affordable for them. (Water supply)
- Technology choice affects affordability. Consulting female and male users may result in a more acceptable, user-friendly and sustainable service. (Water Supply)
- The poor and women farmers' lack of access to finance prevents them from developing more prosperous and water-efficient agricultural enterprises, and limits their participation in agriculture to a subsistence level activity. (Agriculture)

3) Gender and social equity linkages

- Powerful groups of society, usually male dominated, can exploit resources more systematically and on a large scale as well as drive industrial transformation of the environment, thus their potential to produce damage is higher. (Environment)
- When water is not supplied by a piped system, the burden of water collection falls on women and children, who must expend considerable time and energy on this activity. (Water supply)
- Women rarely have equal access to water for productive use and are the first to be affected in times of water shortage. (Agriculture)
- Women and children are the most susceptible to waterborne disease due to their roles in water collection, clothes washing and other domestic activities. (Sanitation)

Gender and economic efficiency

Achieving economically efficient use of our limited water and financial resources requires attention to gender. It enables:

- **Effective investment:** Water infrastructure can be more widely and optimally used, maintained and sustained when women's and men's demands, expectations, experience, involvement and knowledge are considered. Such consideration enables targeted solutions in technology, payment and management systems, and other domains, and can result in better use of limited funds, human resources and water.
- **Enhanced cost-recovery:** Recovery of investment in water services can be improved if women's and men's traditional roles in water management are recognised and promoted in an equitable manner.
- **Enhanced ownership:** Communities feel more committed to water projects that properly target gender-specific issues. A 1993 World Bank study of 121 water projects showed that the systems that include users (both women and men) in planning, building and management, usually perform better than those that lack participation (at least in rural cases). Gender-sensitive participation was consistently a factor for success in quality of design, quality of implementation, project efficiency, operation and maintenance.

- **Conflict prevention:** Conflicts are very expensive, in social, economic and political terms. Consideration of gender in water management may help reduce potential conflicts related to water allocation and water tariffs**.** Recognising the differences in payment ability and understanding who pays the water bill within a community can reduce the potential for conflict and lack of payment. Many studies reveal that women usually pay for water even though their financial burden compared with income is greater than it is for men. A gender-sensitive approach enables the creation of better-designed tariff systems that are both affordable and economically sustainable in the socio-economic context of a population.

Question from the ground

In your country, is there a gender-sensitive approach being used in managing water resources? If not, give reasons why this approach has not been adopted.

Principle 4: ***Water has an economic value in all its competing uses and should be recognised as an economic good as well as a social good.***

Water has a value as an economic good as well as a social good. Many past failures in IWRM are attributable to ignoring the full value of water. The maximum benefits from water resources cannot be derived if misperceptions about the value of water persist.

Value versus charges

Value and charges are two distinct concepts. The ***value of water*** in alternative uses is important for the rational allocation of water as a scarce resource, whether by regulatory or economic means.

Conversely, ***charging for water*** is applying an economic instrument to achieve multiple objectives as follows:

- To support disadvantaged groups;
- Influence behaviour towards conservation and efficient water usage;
- Provide incentives for demand management;
- Ensure cost recovery; and
- Signal consumer willingness to pay for additional investments in water services.

When is it appropriate as an economic good?

Treating water as an economic good is imperative for logical decision making on water allocation between different, competing water sectors, especially in an environment of water resource scarcity. It becomes necessary when extending supply is no longer a feasible option. In IWRM, the economic value of alternative water uses helps guide decision makers in the prioritisation of investment. In countries where there is an abundance of water resources, water is less likely to be treated as an economic good since the need to ration water usage is not so urgent.

Why is water a social good?

Although water is an economic good, it is also a social good. It is particularly important to view water allocation as a means of meeting social goals of equity,

poverty alleviation and safeguarding health. In countries where there is an abundance of water resources, there is more of a tendency to treat water as a social good to fulfil equity, poverty alleviation and health objectives over economic objectives. Environmental security and protection is also part of the consideration of water as a social good.

Applying the concepts

In the real world, in a situation of water scarcity, should water be provided to a steel-manufacturing plant because the manufacturer has the ability to pay more for water than thousands of poor people who have no access to safe water? Can you find any similar examples from the ground level in your country? How was such a situation solved?

1.5 Importance of economic and financial instruments for IWRM

IWRM seeks to improve the efficiency, sustainability and equity of water allocations, using a multi-disciplinary approach that recognises cultural diversity and socio-economic disparities inside and among societies. As such, IWRM will benefit from a sound use of economic and financial instruments that allow decision makers and water users to achieve those goals in a context of democratic decision making. In this context, the effectiveness of economic and financial instruments is dependent of context and historic and socio-economic conditions. These must always be carefully considered when recommending specific use of economic and financial instruments for IWRM.

Before defining the meaning of economic and water finance instruments, we first need to define the subject matter of economics and finance. In very simple terms, ***Economics*** refers mainly to situations in which a decision must be taken regarding the allocation of scarce resources among alternative uses. Economic analysis pays high attention to the efficiency of the allocation and to the distribution of assets and incomes behind and around the allocation process. Economic instruments for IWRM are rationing rules or incentives that influence the allocation and distribution of water or water-related assets and incomes. Water prices, water tariffs, water rights, and water policies and regulations are among the most important economic instruments. Economic instruments are evaluated in terms of impacts on efficiency, equity and environmental outcomes for society.

Finance, on the other hand, refers to specific actions taken by organisations or firms, which can be private or public, in order to maximise short or long-run returns to their assets and investments. It is assumed that the firm's goals are clear and the role of financial tools is to assure that resources are available (in time and space) for achieving these goals. Standard financial tools are those that are under control of the firm and that affect resource flows to achieve goals, like loans, shares and cash management. Financial tools are evaluated in terms of effectiveness to achieve stated goals by the firm.

We may conclude that, as water is getting increasingly scarcer (both in quantity and quality), societies (also facing population growth, and the associated needs in terms of access to water, food production and industrial development) face increasing challenges for the allocation and distribution of water and water-related assets and

incomes; and this triggers increasing interest in using economic and finance instruments.

The use of economic and financial instruments is increasingly important for IWRM because:

- As water is becoming scarcer, its economic value is rising and the use of economic instruments for sharing its use or consumption by competing sectors or groups becomes more important for societies;
- Alternative economic and financial instruments can be used for achieving IWRM goals and in different ways, it is important to consider what the involved trade-offs are in terms of efficiency, equity and sustainability;
- Without financial viability for water-related projects and decisions, IWRM will not assure a sustainable flow of benefits for users, as legal and political restrictions are increasingly imposed on deficit-generating activities and organisations;
- There is an important confluence for achieving efficiency and environmental goals in IWRM with the use of some economic instruments (for instance higher water tariffs for polluting activities); thus, an appropriate use of these is key for IWRM;
- There are important complementarities between using sound economic and finance instruments for achieving similar goals. For instance, under some circumstances, higher water tariffs will assure higher efficiency in use with a more appropriate financial framework or enabling environment for sound water-related services and investments; and
- Economic instruments tend to send appropriate signals to producers and consumers about the increasing scarcity of water (something that is less likely when using only non-economic measures);

In general, economic and finance instruments for IWRM are becoming more and more important for taking better decisions that improve water management, not only for current but also for future generations.

Question from the ground

Is there a need for economic and financial instruments in managing water resources in your country?

1.6 Implementing IWRM

While there has been progress in understanding the meaning of IWRM, its importance in the context of scarcity, acknowledgement of the main (Dublin) principles, and growing recognition of the need to use the right mix of economic and financial instruments, the actual implementation of IWRM is a challenging process.

There are several roadblocks to implementing IWRM, starting with entrenched sectoral interests, professional insecurities and socio-cultural myths. These challenges are nevertheless not insurmountable. The barriers to the implementation of IWRM require an incremental approach to negotiating differences, cross-sectoral integration and instituting reforms (including policy and legal reforms).

Conflicts among professionals working in the various sectors and a sense of vulnerability in adopting alternative approaches to water development and management that permeates professional groupings call for skills in negotiating win-win solutions and providing platforms for very different stakeholders to develop collaboration in implementing IWRM. These processes take time and require patience.

IWRM can only be successfully implemented if, among other reforms, there is a concerted effort to integrate perspectives and divergent interests of various water users in the management framework. Formal mechanisms and means of cooperation and information exchange should be established at different levels to achieve cross-sectoral integration. Past informal attempts have not been successful, and a formalised set of mechanisms should have the effect of ensuring commitment at the various levels.

Existing institutional and legislative frameworks have not been entirely responsive to the demands and requirements for implementing IWRM. Implementing IWRM will therefore require reform at most stages in the water planning and management cycle.

Although there is an urgent need for reform, these changes can only take place incrementally – some occurring immediately and others taking several years of planning and capacity building. It will involve creating an enabling environment, developing an institutional framework and management instruments for sustainable IWRM.

These issues on IWRM implementation will be treated in more depth in Chapter 8. Chapter 2 will provide more detail on the issues of water management and the forces causing them. It will explain the need for an economic approach to the issues and will discuss the importance of finance in addressing these issues. Economic and financial instruments will help to create the right environment for water management and will contribute to solving the water management issues identified.

Box 1.6: Water crisis, or are we on track to meet the target?

Water-Progress Lagging: Target 10 of MDG 7 is to halve the proportion of people without sustainable access to safe drinking water by 2015 (UN, 2006). The share of people throughout the world with access to safe drinking water has continued to rise, reaching 83% in 2004 (up from 78% in 1990). However, on current trends, sub-Saharan Africa will not meet the target. This is due to factors such as high population growth rates, low government expenditure (particularly on operation and maintenance), conflict and political instability. Wide disparities between rural and urban areas persist in sub-Saharan Africa, where city dwellers are twice as likely as their rural counterparts to have access to safe water.

Sanitation – Progress lagging: 1.2 billion people gained access to sanitation between 1990 and 2004. However, to meet the 2015 sanitation target, over 1.6 million people need to gain access to improved sanitation. The most serious problems are in sub-Saharan Africa and South Asia.

Key messages

- Sub-Saharan Africa remains the area of greatest concern. Over the period 1990–2004, the number of people without access to safe drinking water increased by 23% and the number of people without sanitation increased by over 30%.
- There are huge disparities between regions: while the percentage of people who have access to drinking water through a household connection is as low as 16% in sub-Saharan Africa, it is much higher in Eastern Asia (70%), North Africa (76%) and Western Asia (81%).

Source: DFID, 2006

IWRM implementation: final country level questions

Having gone through the basic principles of IWRM, you will probably be able to assess the situation in your own country when it comes to implementation of IWRM. Some of the questions you may want to answer are:

- What is the evidence of commitment to integrated water resources management in your country?
- Is there any adoption of water management principles in your country?
- Are economic and financial instruments being used in water resources management in your country? Give examples where possible.
- How are men and women affected differently by changes in water resources management in your country?
- Using the information in Box 1.6, discuss how IWRM may be able to resolve the issues presented.

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CHAPTER 2
FROM WATER-RELATED ISSUES TO ECONOMIC AND FINANCIAL INSTRUMENTS

Goal

The goal of Chapter 2 is to link the water issues that participants are facing with available economic and financial instruments, and to explain which other criteria play a role in decision making in the water sector.

Learning objectives

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

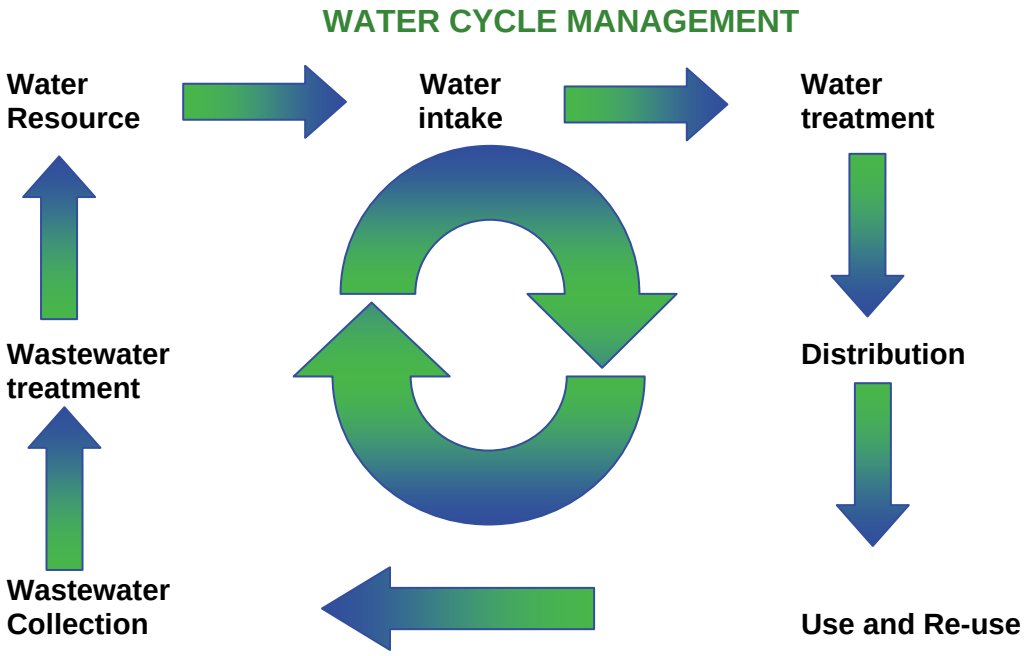
- Be aware of the problems people face concerning water;
- Learn to appreciate that issues have technical, social, cultural and economic aspects;
- Be aware that this implies a different approach to water management;
- Understand the difference between economic and financial instruments; and
- Clarify the difference between efficiency, equity and sustainability in the case of water-related decisions.

2.1 Introduction

After the introduction to integrated water resources management (IWRM) in Chapter 1, we will now review the issues in the water sector that invite the use of economic and financial instruments to help to solve them. Subsequently, an economic and a financial approach to water issues will be explained. Finally, the use of three important criteria in water management (efficiency, equity and sustainability) will be discussed.

Our point of departure is the water cycle. In Singapore, no water gets lost between the resource, the use for drinking water and the treatment and reuse. This is illustrated in the following figure.

Figure 1: A picture of the water cycle, showing where costs and revenues can be expected



Source: Van Dijk (2007)

Each flash in the figure represents a point where costs are made and revenues can be obtained. It is also possible to deal with the process in an integrated way, as they do in Singapore. In that case, the costing and charging could also be integrated in one exercise (for the costs) and one bill for the customers.

2.2 The issues: from achieving the MDGs to involving stakeholders

In Chapter 1, the problems with achieving the MDGs in water and sanitation were listed. However, there are ever more people and it sometimes seems that the resources to deal with the issues are becoming more and more scarce. For an economist, scarcity means we need to use the resources in a more rational way, as will be explained below. Taking the water cycle as the point of departure, there are problems in managing the resource or the quantity of water. Problems with the quality of water arise when making the resource usable for human consumption, agriculture, or industry and when we want to recycle the used water. It is important to involve the stakeholders at each stage and to promote private initiative. The following box lists a number of issues, but not necessarily in the order of their importance.

Box 2.1: Major issues for Water resources management

1. Achieving the MDGs: improving access to safe water and sanitation, and cleaning up the environment
2. Anticipating the consequences of climate change (too much water, not enough water, and bigger variability)
3. Pollution of resources
4. Inadequate distribution of the water resources
5. Using private initiatives
6. Water is not sufficiently conserved.
7. The physical infrastructure is not in place or is poorly maintained.
8. There are not sufficient funds available for water management, and for the water and sanitation sector.
9. Government agencies are not doing what they are supposed to do in the water sector, and they lack the means and expertise to do what they should do.
10. Can the role of the government not be limited to creating an enabling environment and regulating the operators in the water sector?
11. How are water rights allocated?
12. Floods and droughts
13. What is the best level to deal with these issues: the national, regional or local level, the basin or the catchment?

In a more systematic way, we can point to the following processes or forces that make water an issue to deal with:

1. Economic growth, leading to more demand for water, and more pollution of the existing resources;
2. Population growth and increased urbanisation, leading to more consumption and pollution;
3. Concerns about the health of people and the environment;
4. Forces to increase the scale of production and to go towards bigger utilities and more modern equipment;
5. Government failure to deal adequately with the issues;
6. Market failure (In a number of cases related to water, the private sector has also not stepped in to solve the issues);
7. Increasing critique on the poor management of utilities and river basin organisations;
8. The search for achieving economic, environmental and social sustainability; and
9. Climate change

2.3 Social and economic good: a more rational use of resources

The Dublin principles (mentioned in Chapter 1) implied that water is a social and an economic good. The Dublin meeting was the first time in the context of the United Nations that the economic nature of water was emphasised. The short summary is: water is a scarce product, with multiple competitive uses, that needs to be treated and which commands a price.

Economics is about making choices when resources are scarce. This is certainly the case when water is polluted and needs to be consumed, or when investments are necessary to connect more people to drinking water and sanitation systems. It is also the case if there are competing claims: water for human consumption, for agriculture and for industry. In a context of scarcity, markets come into existence where the good is traded and a price is paid. The word market is not used here in the sense of

'water markets' with their specifically defined property rights (which will be discussed in the following chapter), but rather in the sense of a place where demand and supply meet.

What kind of mechanisms would help to make a more rational use of the existing resources? In the first place, economists think that demand and supply for water can meet if water is given a certain, hopefully realistic, price. This is recognised by the Dublin principles and makes water an economic good. As will be explained in the following chapters, this requires markets that 'will clear' (demand will be equal to supply at the market price). However, the markets should not be distorted by monopolies, government regulation or vested interests, which is often the case in the water sector. Economic theory will prove that, without distortions, the resulting price is an efficient solution. This means that there would not be a more optimal quantity sold or bought at a different price. In practice, regulation is needed to correct for the distortions.

Secondly, economic activities take place in a certain environment, which can either be conducive to the development of water-related initiatives or not. If there is economic growth, it is much easier to make the necessary investments. In the same way, finance can be obtained more easily if there is something of a capital market, and if inflation and interest rates are low. These are so-called macro-economic conditions for growth and distribution. However, there are also factors at the local level, such as: *Who owns the water?*, *Is it located close to the users or not?*, and *What do you need water for?*. These are the factors that determine whether water is a problem (say in a Sahelian country) or not (if you live next to a major river that is not polluted, and there are no competing claims exhausting or polluting the resource).

Finally, all kinds of economic instruments have been developed, which help to smoothen the water production and distribution process. If the government can levy a tax, it would have money to spend on water and sanitation. If the utility uses a reasonable tariff, it can invest in new connections; and if the polluters pay the water board or the river basin organisations, they can do something to improve the situation.

The rational use of resources usually requires that consumers, farmers and industrialists contribute to the cost of managing the water, cleaning it and bringing it to their houses, farms or factories.

2.4 Economic and financial instruments

Considering the use of economic and financial instruments helps us to achieve many of the objectives implicit in Box 1. The economic instruments first help to create the right environment (a conducive environment for water projects) and subsequently help to achieve a number of policy objectives. The best-known economic instruments are taxes, subsidies and the determination of prices, or – once such price is fixed by some authority – the tariff. The fixing of these prices is usually not left to the market, for example, because the price is very important for poor people. Related economic principles (besides *rational use of water*), which are also used in the water and environmental economics, are *cost recovery* and *the polluter pays*. The financial instruments subsequently help to take specific investment decisions.

2.5 The importance of institutions

Although it may seem that markets take place in an institutional vacuum, in fact all kinds of traditions, norms and rules determine the functioning of a market, whether it is one for bread or for water. There may be mechanisms to assure that everybody knows about the price (auctions), and there may be rules to allow you to check the quality (tasting in a food market, for example). The issue of what kind of institutions we need for good water management may also be called the issue of water governance. Jaspers (2003) defines water governance as "the social capacity to mobilise in a coherent way water resources to achieve sustainable development". This includes the capacity to design publicly accepted policies, oriented towards sustainable development and making effective their implementation through all stakeholders involved. Jaspers indicates that the level of water governance in any society is determined by factors like the existence of consensus, the level of consensus and compliance, and the availability of a management system which enables within a sustainable framework the implementation and follow-up of those policies.

The role of institutions is important. Examples of institutions that can be mentioned are norms and traditions, legal frameworks and policies, rules and procedures. These institutions have evolved over time and the ones developed from the base are sometimes more effective than the ones superimposed from above. Social enforcement and some kind of control over the respect of these institutions are desirable. Finally, there are institutional arrangements. These are specific arrangements developed to deal with the management of resources that have become scarce, such as water.

If certain institutions are no longer useful, they may need to be reformed, although that may be a painful process. However, it takes a lot of time to develop new institutions. So, if existing institutions can be reformed, less time and effort may be required. What reforms may imply, is described in the following box (2.2):

Box 2.2: Different types of reforms

1. Introducing new practices through legal reforms, like decentralisation, stakeholder participation, more rigorous cost recovery, or private sector participation
2. A new goal for the organisation
3. Rationalising the production process
4. Redesigning tasks and responsibilities
5. Changing different procedures

Question from the ground

Which important institutions in your country govern the use of water?

2.6 Financial instruments

One way of improving water efficiency is by investing in and improving infrastructure. This may also lead to more attention to operations and maintenance (O&M) and to a reduction of losses in the system. However, any investment made must be rational and weigh the resources necessary (capital, labour, raw material, etc.) to assure the optimal use of such resources. Tools developed for this purpose are cost benefit analysis, life cycle costing and multi-criteria analysis. They are discussed in the following chapters. The issue becomes even more complicated if the decision implies a decision to invest in one or another sector. However, it is sometimes true that an investment in basic education may have more effect than continuing to try to get people to wash their hands, or to explain to grownups that they should boil the water to ensure that it is safe for the health of their children.

Part of the investment decision is identifying the sources of finance. Among the costs to be added up are the costs of capital. They may be zero in case of a grant, low in case of a soft loan, but high if a commercial loan is necessary. The blending of different types of financial resources is an important way to bring down the cost of an investment project.

2.7 Policies on management, use and financing of water resources: facilitating financial flows

There are important complementarities and synergies between water policies and sound economic incentives and the possibility of having appropriate financial flows for water management. For instance, in a society in which water is really considered a scarce resource and water tariffs are set up to reflect the total economic value of water, it will be easier to generate financial resources for water management. In this case, the costs of water management will be incorporated in the water tariff system, and functions related to water management will have financial support. In other circumstances, financing of water management cannot be done via water tariffs but mainly via fiscal expenditure, coming from the general taxation system. This second solution, however, is likely to be less efficient than the other one for water management, due to difficulties for a correct allocation of public expenditures to complex and dynamic water activities, and also due to the fact that water users would not get appropriate signals about the scarcity of water.

In general, it seems preferable to have a system in which water users (be it consumers or producers) pay for any private benefits from water they get, whereas the public sector mainly finances activities and functions which are related to the provision of public goods in water-related activities. This is equivalent to having a system with cost-covering water tariffs for residential, industrial, electric and agricultural water use (including payments for water polluting activities), whereas public or tax financing can be oriented to the provision of water management for aesthetic and recreational water values, prevention of water-related disasters and water-related health problems, and for protecting some non-use values (preservation of areas or endangered species). This is what we consider an enabling water management system, which will likely be more effective in terms of efficiency, equity and sustainability for water management.

Three types of criteria can be used for evaluating the role and potential usefulness of different actors and their projects. The prices they charge should reflect the expected efficiency, equity and environmental criteria. We will now explore these concepts applied to different examples of investments in the water sector and the fixation of different types of tariffs.

1) Efficiency

The goal of water resources management is sustainability, but this should be accompanied by social equity and economic efficiency. We mentioned that markets assure an efficient allocation of goods, but this is the theory. In practice, we often need to consider other issues. For example, equity issues (*Does everyone get the same chance?*) and *What about sustainability?* (*Is the solution a lasting one that does not affect the environment negatively in the long term?*). In many countries, water efficiency can be improved. That would entail better allocation decisions between different types of use (agriculture, human consumption and industrial use), but also to improve the functioning of the organisations we have created to achieve the desired results.

In Box 2.3, we distinguish between technical and allocative efficiency. Together, they are known as economic efficiency. Another definition, with its roots in welfare economics, is the following: Economic efficiency is the organisation of producers and consumers in such a way that all unambiguous possibilities for increasing economic wellbeing have been exhausted (Young, 1996).

Box 2.3: The distinction between technical and allocative efficiency

There are two basic notions of efficiency used in economic theory: technical and allocative efficiency. Together, these two are known as economic efficiency. Technical efficiency is traditionally related to production and refers to firms getting a maximum output per unit of input, or using minimum input for a given target output. Assuming a given technology, one firm is more efficient than another is, if it is able to produce more output from the same number of inputs, or uses fewer inputs for a given output. The concept, however, can also be applied to consumers, if we define "output" as the utility coming from input use. Consumers that are more "efficient" will be those that get more utility from the same input, or use fewer inputs for achieving a target level of utility.

Prices do not intervene directly in the definition of technical efficiency, which is based only on technological relationships. However, prices will set the incentives for firms or consumers to adopt production (or consumption) technologies that are more efficient. The point is that actors will seek to save on inputs if these are costly or have become more costly for them.

Looking at the different types of tariffs that can be charged and are discussed in Chapter 4, it should be clear that a fixed tariff will hardly promote any technical efficiency of producers or consumers. Under that system, there is no incentive to save water. For instance, farmers who pay a fixed amount would not have incentives from a low tariff for adopting water-saving technologies (although they can adopt it because of more profitability due to other cost savings and higher productivity). Only tariffs with variable components have incentives for improving technical efficiency in water systems. Steeper slopes for tariffs will provide higher incentives for efficiency improvements, and using block tariffs with increasing charges is an even better way of promoting technical efficiency among users.

Allocative efficiency, on the other hand, is a more general concept and is the source of a lot of confusion when applied to water issues, as we will see below. Allocative efficiency refers to the use of inputs in a way that maximises total net revenues for firms or that maximises the consumer surpluses for consumers. This implies using inputs in ways that follow the signals of relative input prices. Economists know that this means equalising the marginal revenues to the marginal costs (or the marginal cost price rule; see Bahl and Linn, 1992).

2) A social good: equity issues

Water is also a social good, meaning social considerations play a role in allocation decisions. Many countries follow (for example) a lifeline approach, meaning that everybody needs at least 20 litres of water per day; and this quantity is supplied free of charge. If you consume more, you have to pay; and through cross-subsidies, the great consumers pay for the poor.

When we speak of achieving equity in water, we have in mind mainly the situation of vulnerable groups of society, which are excluded from access to basic goods and services, in this case to water. A particularly acute equity problem is the case where the poorest group pays more per unit of water than all other social groups, which is a situation we find in cities with partial coverage of potable water. The situation of women and children is often very acute. They find it hard to gain access to safe water, or it would require major efforts in money or time.

An important equity issue in irrigation occurs when farmers that are located downstream receive less water than anticipated due to increasing losses in distribution. Marginal sectors on irrigated areas are the first to suffer from shortages when a drought strikes, for instance. Gender issues can also be considered as an equity issue. They were mentioned in Chapter 1, and will come up in different other chapters.

There is a debate on the potential adverse effects of water reallocations on equity. Adverse consequences for equity may derive from possible side effects of these reallocations. The most important problem of equity in water reallocation comes from the presence of externalities affecting vulnerable groups with few means of responding to changes in access to water. Examples of positive external effects are a reduction in the time that women have to spend because of a different supply system, or the health effects of good quality water.

As an example, opening a water market (a market where water is bought and sold based on specified property rights) may improve the wellbeing of the parties that can use the market, but may have adverse effects on the wellbeing of other agents who are not participants, without these latter effects being fully incorporated into the market mechanism. This would be an example of a negative external effect and could happen precisely because, in a market context, resources are also needed to correct for the transactions that affect third parties negatively. It is possible that those affected are the poorest actors, who are the least well endowed with the resources needed to correct for these transactions. The best-known negative external effects are those of industrial production on the environment: water and air pollution, and the effects of non-treated sewerage that comes from urban slums.

The challenge is to also address poverty issues, as analysed by Franceys and Bos (eds., 2003), for example. The next box gives five different suggestions, based on the work of UN HABITAT on Water for African Cities (Van Dijk, 2004).

Box 2.4: Private sector participation, and the poor

- West Africa: Standpipes or mobile water vendors in those areas where there is no piped water system
- South Africa and Ghana: Lifeline approach, assuring that a minimum quantity of water is provided free of charge to each member of a household
- Santiago de Chile: The Municipality reimburses a large part of the water bills of the poorest 20 percent of the urban population.
- Micro-savings and credit for originally saving and then paying connection fees for water and sanitation connections, which would otherwise be too expensive for poor people
- Cross-subsidies, charging more to the bigger consumers, to allow a lower tariff for poor people

3) Sustainability

We will now discuss economic, social and environmental sustainability, and total sustainability (when all three are achieved). Other definitions of sustainability have been developed, for example by the famous Brundlandt Commission, but our definition of total sustainability consists of economic, environmental and social sustainability. By environmental criteria, Brundlandt meant those concerned with the attainment of conditions for a sustainable exploitation of natural resources and the environmental assets valued by present and future generations. In the hard version, no resources should be used up; while in the soft version, they can be used if alternatives are made available (for example wind energy replacing natural oil). They would need to be properly conserved to see to it that future generations would not suffer from resource depletion.

The relationship between environmental objectives and the functioning of water systems can be very complex. In an institutional context where environmental objectives are given no real expression (either within institutions or among decision makers), the water sector will tend to reflect this situation and is very unlikely to produce positive environmental effects. For example, if the overall effect of economic policies is to favour rapid economic growth with intensive use of water-polluting production processes, as is presently the case, for example, in China, the water sector will only amplify this, since water will be allocated to the activities favoured by these industrialisation policies.

This general consideration notwithstanding, better water management can be useful for attaining environmental objectives under various circumstances. For example, improving water management is a very good way of dealing with the growing demand for this resource. The traditional government response to growing demand has been to construct water control and distribution infrastructure. These projects have usually had a negative environmental impact; so, better management is one option for avoiding or reducing effects of this kind.

Economic viability means the benefits are more than the implied costs. Financial sustainability means an activity can be carried on without the need for additional outside financing. Environmental sustainability is defined as a lasting solution that does not affect the environment negatively. Social sustainability would be a solution that is socially acceptable in a given social and cultural context. Finally, total sustainability would then be the combination of economic, financial, social and environmental sustainability.

Rogers et al. (2002) conclude that water pricing is conceptually the simplest way to promote equity, efficiency and sustainability, but it may be one of the most difficult ones to implement politically.

Question from the ground

What do you consider more important – equity or efficiency, and why? Can you give examples from water resources management in your country where one of these principles was prioritised? Which were the pros and cons?

2.8 Conclusion: With the private sector and other sources of finance

We notice a proliferation of management models in the water sector: from municipal water corporations to community-managed water supply; and from public utilities to private providers. It will not be useful to impose one model. Rather, different models may converge towards a model with more outsourcing and closer regulation in the future.

The leading ideas of this chapter were the following five:

1. To improve water resources management, it is important to create an appropriate economic environment.
2. Subsequently, all kinds of economic instruments can be used to achieve the goals formulated for IWRM. They will be discussed in detail in Chapter 4.
3. If Operation and Maintenance (O&M) or investments are necessary, it is important to speak the language of the financial world. Financial institutions think in terms of investment cost, rates of interest, and payback periods.
4. However, if you can show that a project brings about a cashflow because the users pay small fees, and that such a cashflow would allow a reimbursement of the loan taken to finance the project, bankers can be convinced to provide the money.
5. Another leading idea that will be elaborated is that there are many sources of finance. Particularly in Chapters 5 and 6, very different sources will be enumerated, each with its own rules, procedures and conditions.

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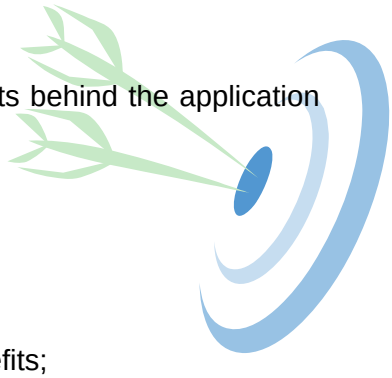
CHAPTER 3
INTRODUCTION TO ECONOMIC INSTRUMENTS

Goal



The goal of Chapter 3 is to introduce key economic concepts behind the application of economic instruments for water management.

Learning objectives

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

- Know what are the public good aspects of water benefits;
- Manage basic economic concepts of supply and demand, and full cost recovery;
- Have clear definitions of economic instruments for water management and its use in specific water situations;
- Understand concepts behind water valuation and cost-benefit analysis; and
- Know about evaluation criteria in using economic instruments for IWRM

As we discussed in previous chapters, economic instruments are increasingly important for IWRM. Experience shows that using only supply-oriented approaches, which generally ignore the use of economic instruments and demand management, is not an effective way for finding efficient, equitable and environmentally sustainable solutions to water problems. In this chapter, we introduce the rationale for using economic instruments for water management, emphasise its critical role for tackling water problems in a more integrated way, and look at solutions with a better balance between supply and demand management approaches.

3.1. Identifying the benefits of water as an economic good

Water holds important and diverse benefits for society, for example:

- Use for drinking, cooking and sanitation
- Industrial use
- Hydroelectric use
- Transportation
- Fishing
- Agricultural use (crop irrigation, livestock)
- Waste assimilation benefits (of water)
- Aesthetic and recreational values
- Ecological values (sometimes as non-use values)
- Avoiding or controlling water-related risks

Many of these benefits of water have what economists call public-good features. A public good is featured by two notions: the good is not rival (or has low rivalry), meaning that its consumption by a user does not reduce potential consumption by

others. The second feature is non-exclusion, meaning that it is difficult or too costly to exclude potential consumers from its benefits (see Box 3.1).

Box 3.1: Definitions of rivalry and exclusion

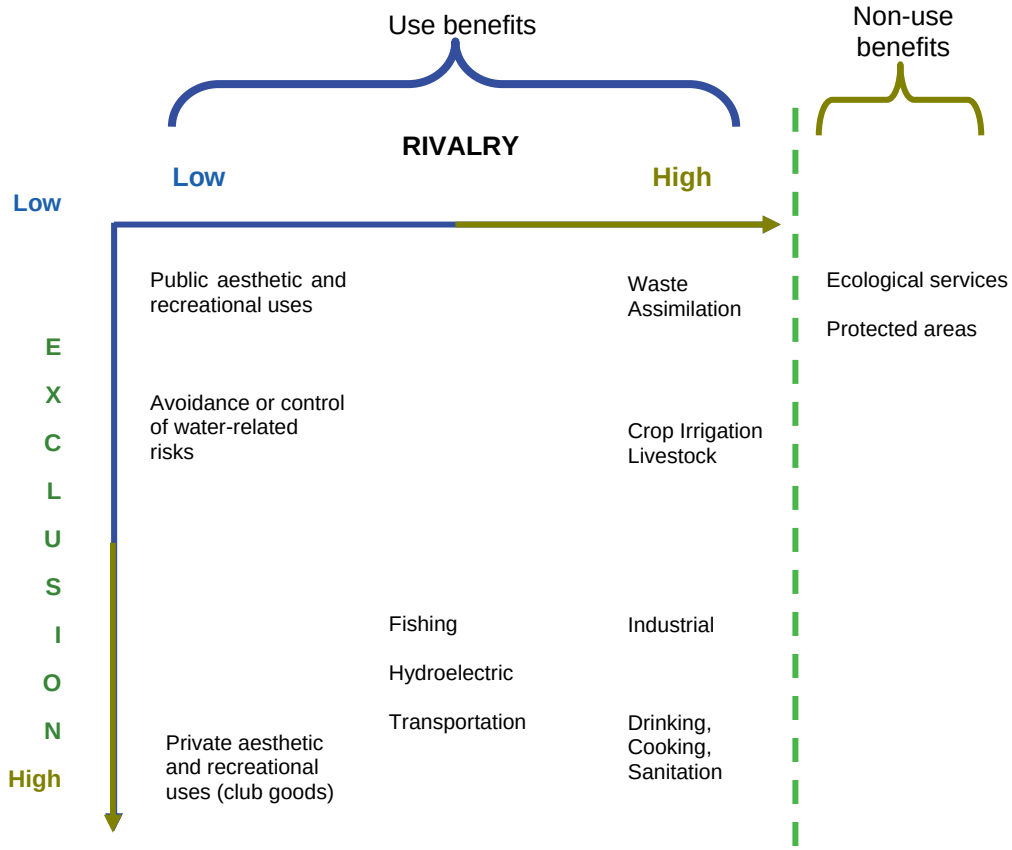
Rivalry: A good or service is said to be rival in consumption, if one person's use thereof in some sense precludes or prevents uses thereof by other individuals or businesses. It refers to the nature of the consumption process. Food, for example, is a typical rival good, as consuming one unit of bread implies that one fewer unit of bread is available for the rest of potential consumers. Light from the sun (to some extent) has low or no rivalry, as consumption by one does not necessarily reduce availability for others.

Exclusion: refers to the possibility of excluding persons who are not entitled from using the good or service. A good is *excludable* if there is some mechanism (physical or institutional) that restricts potential users from consuming it at some time or place. Property rights are institutional devices to restrict or exclude potential consumers (or users) from goods or resources, which are generally supported by some physical mechanism to restrict access by third parties (fences, access codes, etc.). Land is generally an excludable resource, whereas "air" (not necessarily clean air) is a resource with very low, or no, excludability.

Source: Young (1996)

Goods and services are generally located in continuum for these two features that characterise public goods. In Figure 3.1., we locate water benefits in a rival-exclusion quadrant, so we can identify public-good aspects of these. As the rivalry dimension only applies when there is actual use of a good or resource (consumption), it only can be related to use benefits. We introduce a non-use category in which society gets benefits from water that is not used or consumed at all.

Figure 3.1: Locating water benefits in a rivalry-exclusion quadrant



Source: based on Randall (1988) and Young (1996)

The public-good nature of water benefits is highest at the upper-left corner of the quadrant. For instance, public aesthetic and recreational uses of water are considered "pure" public goods, featuring both non-exclusion and non-rivalry. We can locate in this category, public and aesthetic uses and benefits coming from non-use as well (for generating ecological services, for instance). Also, benefits from activities to reduce or control water-related risks (flooding) can be considered pure public goods.

Question from the ground

Could you give examples from your own experience regarding the public good nature of water use in different circumstances?

Besides identifying pure public goods in water services, Figure 3.1 highlights the fact that important water benefits show partial public-good features. Waste assimilation benefits, for instance, are located at the low-exclusion and high-rivalry part. This is so, because the capacity of any water stream to serve for waste assimilation is a rapidly congestible good (after some point, it is not possible that water gives that benefit without restricting the same benefit to other potential users).

Services with fewer public-good features (closer to being private goods) are located at the lower-right corner of the quadrant. Here we locate services of potable water and sanitation, which generally have high degrees of exclusion and rivalry. There are services that are also excludable but that show less rivalry in use, like fishing, hydroelectric and transportation activities, which do not necessarily require extracting water (at least in significant ways) from other potential uses.

Crop irrigation is a very important water-consuming activity, as it takes about 80% of consumed water in the world, and is located in the low-exclusion but high-rivalry status. This is so because, in most irrigation systems (especially in developing countries), exclusion is highly imperfect due to weak measuring (metering) of water at the users' level. And, of course, water used for irrigation is mostly rival regarding other uses or within the agricultural sector itself.

Thus, most water benefits have public-good features, which will generate important challenges for the application of economic instruments in water management. This is so because it is difficult to organise markets for public goods, in which case there is no interaction between supply and demand. This is not saying that supply and demand do not exist for these public-good water benefits. Thus, we need to discuss the nature of supply and demand in order to understand the potential role of economic instruments in water management. In many situations, the water "problem" can be defined as one in which demand surpasses the supply for a given type of water service, and the option of using a market for solving the "excess demand problem" is not at hand.

3.2. Supply and demand: Producer and Consumer behaviour

We will describe supply and demand from the point of view of their economic actors, i.e. producers and consumers.

1) Producer behaviour and supply

A producer will have the following features (Varian, 1993):

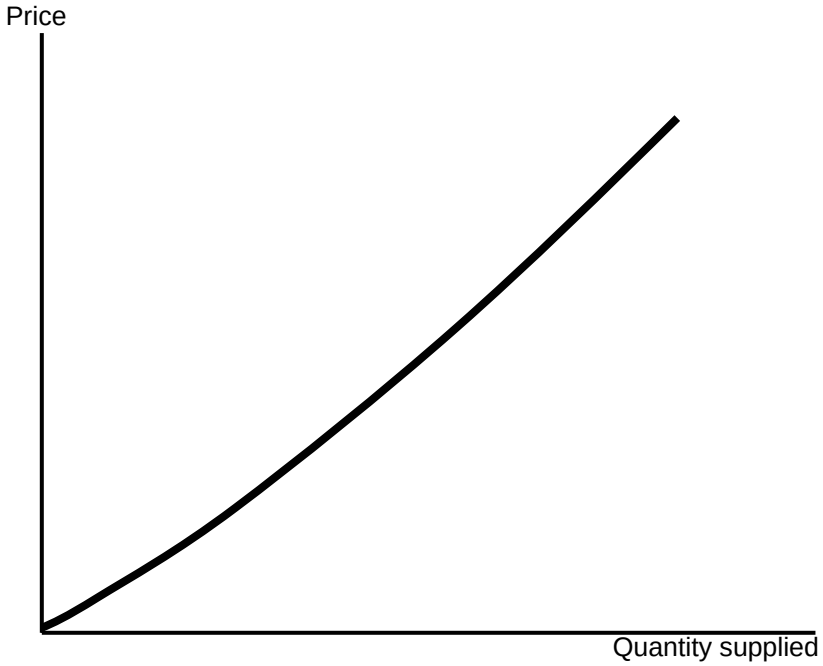
- Seek to maximise benefits from the production of a good or service.

- Use some technology to transform inputs into outputs (or multiple outputs).
- Demand inputs.
- React to changes in input and output prices.

Technology is an important factor behind producer behaviour. But technology alone is not enough for describing producer behaviour. For instance, a new technology can be generated for producing more drinkable water in an area; but if it is not profitable for producers, they will not adopt it. Thus, key factors in producer behaviour are prices (input and output), and producers seeking to maximise profits (sales minus costs) for operating their firms in an economically sustainable way.

The main concept to be aware of is the **supply function of producers,** which is upward sloping in price–quantity, as shown in Figure 3.2.

Figure 3.2: The supply function



Another way to understand producer behaviour is to look at their costs and **cost functions**. These functions relate costs of production to total output and input prices. There are two main categories for costs, namely variable and fixed costs. **Variable costs** change as production changes, and **fixed costs** are independent of production level[1].

Cost functions are very important to characterise producer behaviour. From the variable cost part of the cost function we can derive a **marginal cost function**, which basically tells at any point of production how much it costs to

[1] The notion of variable and fixed cost is time dependent. In the short run, important costs may be considered as fixed if it is not possible for producers to adjust these with production changes. In the long run, however, all costs can be considered variable, as producers can adjust the size (scale) of their production operations as needed. Typically, costs of machinery or infrastructure for production are considered fixed costs in the short term, but may become adjustable costs in a longer term.

produce an additional unit of the output. At that point, the maximising profit producer will want to get a price for that additional unit that is at least equal to the additional (marginal) cost involved; otherwise, it will lose money producing it. This is why marginal cost functions can also be used to characterise the supply of producers, and in a competitive market will generate the same upward-sloping supply curve of Figure 3.2.

2) Consumer behaviour and demand

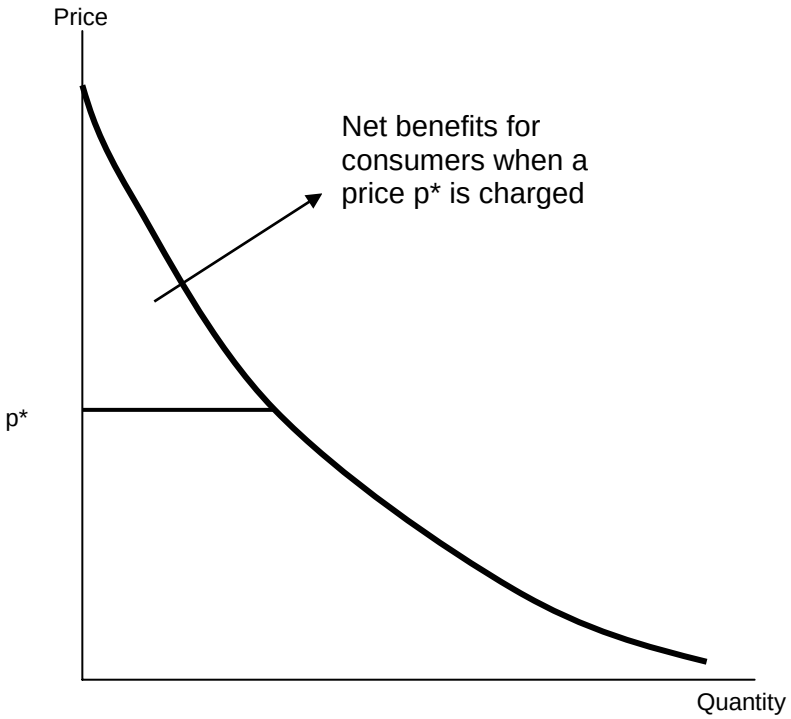
Water is not only used as an input, but also directly consumed, in some cases after passing through other processes. In these cases, we need to think about the behaviour of consumers who will:

- Have defined preferences for goods and services;
- Seek to maximise the benefits (utility) they get from consumption;
- Consider the costs (price) they have to pay for consuming a good or service; and
- Be restricted by their budgets when taking consumption decisions.

In the process of getting maximum benefits from consumption, consumers face an important restriction from their **budgets**. Their budget is the total amount of money they have for expending in goods, and will be related to sources of income, wealth and borrowing capacity. Higher budgets allow consumers to expand the set of consumption goods they can afford to buy.

Consumer behaviour is highly influenced by preferences (a way in which they internally value the good), the price of the good, and budget constraints. All of these will shape what is known as **the willingness to pay** for a good, which is the basis for a **downward-sloping demand function,** relating price to quantities demanded (as shown in Figure 3.3).

Figure 3.3: The demand function



The demand function is crucially important for applied economic analysis, as it gives a measure of the total benefits that consumers may get from a good or service. In competitive markets demand and supply interact and **an equilibrium market price** results. In the competitive case, the price will reflect how much it costs firms to produce the good; and consumers will demand the good up to the point in which their willingness to pay is at least the market price. The consumer surplus (i.e. the net benefits that consumers will get from this good) is the area above the price and below the demand function, as shown in Figure 3.3.

3) Full cost recovery and water

In competitive markets, supply and demand for a good will interact to form an equilibrium price, which leads to optimal allocation of resources. Competitive firms will automatically recover their production costs (otherwise these are out of the market); and each period, the same good or service will be offered to consumers for expected market prices. This type of competitive market, however, is seldom feasible for the operation of water services, given its many public good features (see Box 3.2). Even in cases in which markets can be organised (like for potable water), these show monopolistic behaviour, which characterises water provision when there is a large water infrastructure in place. Thus, potable water provision is often supplied directly or regulated by the State, and the price formation will not be an automatic result of supply–demand market interactions.

Box 3.2: The lack of competitive markets in water

In the case of water resources, markets – with notable exceptions – have serious difficulties to form and organise the allocation of the resource, both between agents and between alternative uses. The reason is related to the way in which benefits from water are formed (see Figure 3.1). The public-good nature of water services means that firms are not able to exclude users from benefits by means of prices, for instance. Another important difficulty is monopoly. In many situations (like domestic use, hydroelectric or agricultural infrastructure), monopoly will characterise water supply; and this will break key assumptions about competitive markets.

Notwithstanding the lack of markets, the production of water services still requires the use of scarce resources, and costs will be incurred. If the price paid for the use of water does not cover these costs[2], we would have problems assuring the provision of water in the near future. Thus, one of the most important principles when we treat water as an economic resource is **full cost recovery** (see Box 3.3).

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Box 3.3: Full cost recovery and IWRM

"The recovery of the full costs should be the goal for all water uses unless… there are compelling reasons for not doing so." (IWRM paper of the Global Water Partnership)

[2] These costs must reflect efficient provision of the water services. Inflated costs related to non-efficiencies and rent seeking in water provision must not be considered as part of a full cost recovery approach to water services.

Mainstreaming Sustainable Cost Recovery

In mainstreaming sustainable cost recovery in IWRM Plans (for instance), there are two recommendations:

- Service providers should aim for revenues sufficient to cover recurrent costs, and should develop sustainable long-term cost recovery policies.
- Revenues from charges should be covered by users as a group.

Many past failures in IWRM are attributable to ignoring full cost recovery

Question from the ground

Do you think that the full cost recovery policy is currently applied in your country to the water sector? How? Why?

But what are the costs to be included in the full cost equation? To begin with, all direct production costs must be considered. These are related to the use of all inputs and capital goods in the process of generating the water service. But often, the use of water services generates the so-called **environmental externalities** (for instance, pollution when used for waste assimilation services), and the costs of generating these externalities need to be considered in a full cost recovery approach to water issues.

Full cost recovery may include the **opportunity cost** of water as a cost, meaning that foregone benefits of using water in its best next alternative needs to be considered as well. The inclusion of opportunity cost in the full cost recovery approach, however, has proven to be impractical for charging users water tariffs accordingly. In general, users will find it very unfair to be charged a "cost" which is not directly related to the provision of the service they are receiving. However, opportunity cost calculations can be fruitfully used as a guide for authorities in using economic instruments, in looking for better water allocations (see Box 3.4), and also in prioritising future water investments, given scarce resources.

Box 3.4: The use of opportunity cost measures in water decisions

"(…) socio-economic realities in most countries, particularly developing countries, would render any implementation of opportunity cost pricing highly impractical". In fact, as the 1997 International Commission of Irrigation and Drainage Conference concluded, it would be inappropriate to roll opportunity costs into water tariffs, for three main reasons:

- Because the information requirements are onerous (opportunity costs vary dramatically by place and season);
- Because levying such charges would (usually correctly) be perceived as expropriation by those who currently use the water; and
- Because it would defy common sense – using the numbers cited earlier, it would mean that farmers in, for example, Chile, Australia and California would be asked to pay more than ten times the cost of providing the service they receive!

Source: Asad et al. (1999)

3.3. Defining economic instruments for water management

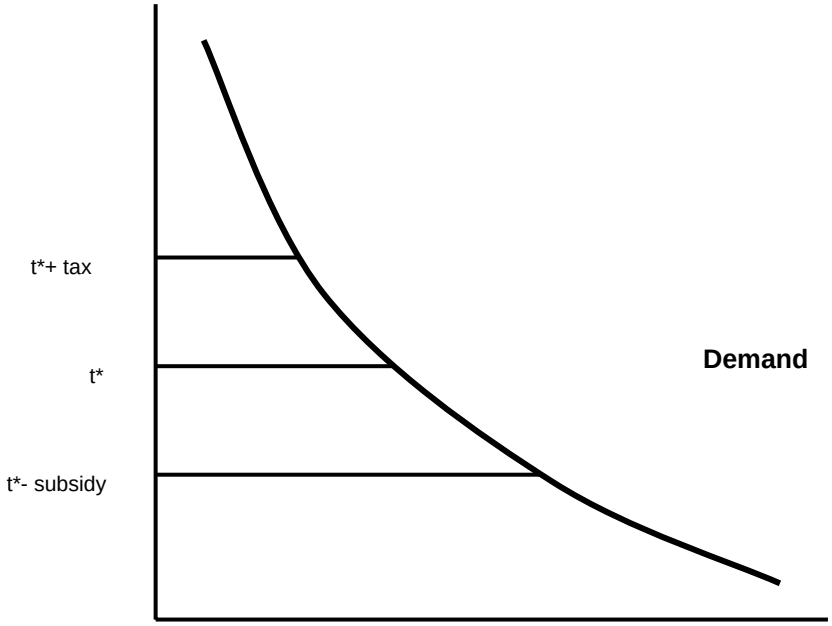
The need for using economic instruments in water management appears when there is an imbalance between supply and demand in water services. Because there are often no markets to solve the problem, authorities will use charges to users, seeking to affect supply, demand, or both. As the supply side in water services often has

public goods involved, economic instruments will also be used to raise revenues in order to finance the provision of these public goods as discussed in Chapters 5 and 6 on financial instruments. Also, authorities may consider introducing market-like instruments, like tradable water permits or tradable pollution permits.

We define economic instruments as (i) price-type or administered price instruments, like water tariffs, taxes and subsidies; but also fees, connection charges, abstraction charges (at water source level) and discharge charges; and (ii) market-type instruments: allowing water rights to be tradable fully or partially in markets.

Water tariffs, for instance, are among the most important economic instruments and are set up to charge users for the recurrent use of water services. These may or may not cover full costs of the water service. If the full cost of water is covered by a water tariff, we can define **taxes and subsidies** as deviations from that tariff. A simple way of seeing how these instruments may work, is shown in Figure 3.4, with t* as the tariff that covers the full cost of a given water service provision.

Figure 3.4: Water tariffs, tax and subsidies



Other important instruments are **water fees**, which might be charged when water permits are issued. Such fees will play the role of a licence that is linked to a permit regime. Water fees are also used for charging access to water-related aesthetical and recreational sites, or are considered as connection charges; and these fees will be paid when a user wants to connect to a water network.

Water **abstraction charges**, on the other hand, are similar to water tariffs, but are charged to multiple users at the source of water withdrawals. These charges are increasingly important for financing IWRM activities. They can either be charged as a fixed amount (like a fee) or depend on water use. Such charges are also known as bulk water pricing, and may be differentiated across user types (industrial, agricultural or utilities). They are potentially important economic instruments for managing inter-sector water allocations.

Discharge charges are applied to activities that discharge effluents into water bodies. These charges are increasingly used to control and reduce water pollution – especially in developed countries – and will vary according to the quantity and quality of the load being discharged. The costs of administering and monitoring these discharges are generally high. Therefore, poorer countries are less likely to impose these, even when there may be considerable pollution due to economic activities in their main watercourses or water bodies.

Economic instruments are powerful devices for water management, especially when there are supply–demand imbalances. An example on how increasing water tariffs may have impacts on different aspects of water management is shown in Box 3.5.

Box 3.5: Effects of increasing water tariffs in water management

a) *Reduce demand*
- Substitutes become cheaper
- Change consumption preferences

b) *Increase supply*
- Marginal projects become affordable
- Provides economic incentives to reduce water losses

c) *Improve managerial efficiency due to increased revenues by:*
- Improving maintenance
- Improving staff training and education
- Making modern monitoring and management techniques affordable

d) *Leads to sustainability*
- Reduces demands on resource base
- Reduces pollution loads due to recycling of industrial water

e) *May reduce the per-unit cost of water to poor people*
- Increases coverage of poor urban and peri-urban populations because additional water is available for extending the system
- Reduces reliance by the poor on water vendors

Source: adapted from Rogers *et. al* 2002

The use of **market-like** instruments is also an important economic instrument for water management, especially for signalling the opportunity cost of water and for reallocating water among sectors with acute differences in water values. Tradable permits may also be a useful instrument for water pollution control, where the authority sets a maximum level of effluents to be discharged on water bodies, and these are divided into quotas which can be marketed by users. The use of water markets, however, is still rare, as these are controversial and there are complex issues (externalities, transaction costs) which affect the correct operation of these. One country in which water markets are allowed is Chile, as shown in Box 3.6.

Box 3.6: Water markets in Chile

"Studies of the workings of water markets in Chile can be grouped into two clearly defined tendencies. One group of researchers believes that the water market in Chile has had quite positive effects in terms of efficiency (Hearne and Easter, 1995; Thobani, 1997), and that this contributed to the remarkable growth of the Chilean agricultural sector in the 1980s and 1990s. Another group of researchers has been more cautious and suggested that the Chilean water legislation, with its clear preference for private rights, ended up by creating serious problems of hoarding and rigidity in the allocation of these rights that have not been and cannot be resolved by the market itself (Bauer, 1995; Solanes and Dourojeanni, 1995). The criticisms of this group are directed against shortcomings in the original allocation of rights and problems generated by private control of the resource, but not necessarily against the operation of the water market itself, which may be having positive effects despite its shortcomings and limitations."

Source: Zegarra (2004)

3.4. Economic instruments and distinct water situations

The design and application of economic instruments for water management will be different for any of the following typical water situations:

- monopoly situations for water provision
- operation and expansion of water infrastructure
- management of water quality and environmental goods
- provision of water management services which are public goods
- pressures for increasing supply or reallocation of water services

1) Monopoly situations

This is the typical case of monopolistic utilities for domestic water services. These utilities are generally under regulation; so, decisions about water tariffs are subject to rules outside the provider itself. The regulatory agency will seek that the monopolist behaves as much as possible like a competitive firm, since this is what maximises net benefits for consumers. But it also wants to assure economic viability and appropriate expansion of the service in the long run, in which case it has to consider future demands and the structure of fixed and variable costs of the industry as key elements for regulatory rules and decisions. For instance, the fixing of water tariffs will need to take into consideration full cost recovery (including fixed costs), which is important for assuring economic viability of service provision in the long run. This will also send the right signals to consumers about the real cost of producing the water services they are consuming.

Box 3.7: Monopoly case: water utilities

Natural monopolies like water utilities are generally regulated by governments, and so these are known as "administered markets" in which the monopolist and consumers interact in the market, but with a public regulator imposing some conditions and rules to the monopolist in order to assure higher economic benefits to society than in an unregulated situation.

Monopolies are based upon very high costs in infrastructure, so these will require that market prices are high enough to finance these fixed costs in the long run. The monopoly requires financing through pricing the substantial fixed costs for maintaining and operating the existing infrastructure (network). This will require some sort of a two-part prices charge to consumers – one flat part that every consumer pays independently of consumption, and another variable part, depending on consumption. The case of a monopolist firm in sectors that provide services through large networks is very relevant for water issues, as most water systems (potable water, irrigations, and river basin management) have these, or some of these features.

2) Operation and maintenance of water infrastructure

An important situation is when a water system (for instance irrigation) is already in place, and the system administration does not have enough resources to operate and maintain a system due to different causes (e.g. fiscal support has been retired, users do not pay tariffs and water tariffs are too low). In this case, the administration will seek to collect at least very basic water tariffs to finance activities related to operation and maintenance (O&M). The results of not doing so will signify important economic costs, as irrigation systems deteriorate more rapidly than planned, and water losses and water waste increase very rapidly. Because of weak water metering in irrigation, these tariffs tend to be flat (cost per cropped hectare, for example) in order to minimise administrative costs and to assure a certain level of revenues.

3) Management of water quality and environmental goods

Water management is a key ingredient for environmental management. The quality and quantity of water has profound impacts on its surrounding environments, which can also be considered as “users” of water services. In a context in which markets do not exist for these services and water plays this crucial role, economic instruments could also be used for making producers and consumers recognise these benefits. Pollution charges, discharge charges and pollution taxes to water contaminating activities are options for reducing the negative effects (externalities) on water bodies.

4) Provision of water management activities

Another usual situation for using economic instruments is when a water administration wants to include new activities or investments that are oriented to improve water management or to expand the objects of water management in a given area (like a basin). There may be a need to issue and register water permits in a basin; and increased multi-sector management, or diverse actions in a water management plan, could be considered in order to have a better functioning of water systems. In this case, the discussion on water tariffs will go beyond the direct costs involved in the “production” of water services (and externalities) inside a specific distribution system, and will be related to the need of an integrated water management approach. Abstraction charges and bulk water pricing are among the most important instruments that can be used for this, as was mentioned before. The financial requirements of these IWRM activities are described in more detail in Chapter 6, in which the application of financial instruments is discussed.

5) Pressures to increase supply or reallocate water among sectors

In many situations, current supply is insufficient to cope with increasing demand. Specific groups of the population may not have access to water services, and these require urgent attention, due to economic and social considerations. Giving additional demands, decisions about the expansion of water supply systems must be made. Issues about the convenience of the expansion and its costs versus other alternatives arise.

The role of economic instruments is also crucial in this case. One way of "generating" more water is to control unnecessary or wasteful use of water by increasing the water tariffs to current users. Usually, these measures are accompanied by better metering and control of water consumption, and also with actions to reduce distribution losses. Reuse of water is also an important alternative for getting more benefits from the same amount of water.

Question from the ground

What are the most important water situations in your country to which sound economic instruments can be usefully applied to improve use efficiency?

Another relevant situation is the instance where there are increasing demands for water reallocations among sectors with different water values. In this case, water tariffs can be used "to signal" the preferences of authorities for a reallocation, charging more to the lower-value sectors. This approach, however, is generally difficult to implement due to political pressures from the lower value sectors (generally agriculture), which will be affected by such a pricing notion applied to the water tariff system.

3.5. Water valuation and economic instruments

Economic instruments are important for water management, especially when there are notorious supply–demand imbalances and misallocations. As markets are seldom available for solving these problems, water authorities will decide about levels and features of water instruments (tariffs, fees, taxes) in order to influence behaviour and allocations. In deciding about this, information is required regarding how users value different water services, i.e. about their willingness to pay for these services.

For example, one important role of economic instruments is that these may allow reallocating water among uses, and types of users, without necessarily increasing water infrastructure. In this case, it is very important for decision makers to know the relative value of water for different users and uses, so that informed decisions can be made about using sound economic instruments to improve water allocation[3]. Even if expanded infrastructure and/or expanded water services are needed, there are compelling reasons to measuring what benefits are to be expected from the additional investments and how (and whom) to charge for covering the costs of generating those. In these important cases, water valuation methods are needed to guide for appropriate water investment decisions.

Cost-benefit analysis and water valuation

Although water valuation methods can be used for a diverse type of decisions, the most important uses for practical purposes are generally set up within a framework of **cost-benefit analysis,** in which water managers must consider the incremental cost and benefits of their decisions. Examples of decisions in which economic instruments (such as a water tariff) may be used are:

- To reallocate water among alternative uses or type of users

[3] As was already noted before, the use of water tariffs as the only tool to promote more efficient reallocations may not be a practical option, as users will need to be charged according to the "opportunity cost approach", which affects lower value users who will be paying more than the value of the service they are receiving. Partial application of the principle could be applicable in certain conditions and will help to promote more efficient reallocations though.

- To expand water infrastructure
- To improve the quality of water
- To expand the water service to include sanitation and wastewater treatment
- To include water management actions at the basin level (very important for IWRM)

In all these cases, decisions will generate potential benefits but also costs for water stakeholders, being these producers, consumers or units of government. The main objective of cost-benefit analysis in the design and set-up of economic instruments for water management is to appropriately measure and attribute these benefits and costs.

As we saw in Section 3.2, any **benefits** to water users can be conceptualised by using the demand curve which was based on users' **willingness to pay**. Even if a market is not in place for the corresponding water service, these demand curves are conceptual devices to reflect how much the water services are valued by users. On the other hand, **costs** are the value of the opportunities or resources foregone in the process of generating the benefits. Thus, an important aspect of water valuation methods for cost-benefit analysis is how to measure benefits of water services, given situations in which there are not observable markets or prices for those. Equally important are the correct estimation of costs and appropriate levels of tariffs to be charged directly to main beneficiaries whenever there is not a compelling reason (like equity considerations) for not doing so.

There are many techniques for valuing benefits of water services, and we will consider some of the most important ones.

Water valuation in residential use

As we saw in 3.1, residential water use is closer to be a private good, in the sense that benefits are highly excludable and rival. Even when water services are provided by monopolistic utilities under regulation, consumers will reveal a demand for the service at the given water tariff or regulated price. This demand, in turn, will reflect consumers' willingness to pay. Thus, we can estimate directly demand and willingness to pay for residential use, as explained in Box 3.8.

Box 3.8: Demand functions from water utilities sales data

"A frequently observable transaction concerning water is that occurring when a publicly owned or regulated water authority supplies water to numerous individual water users. The conditions for a free market are not met, because the buyer is faced with a take-it or leave-it price schedule from a single monopoly supplier. But because the buyer can usually take all the quantity desired at that price schedule, inferences on willingness to pay and demand can be derived if a sufficient number of observations on transactions are available, and the transactions exhibit variation in real price.

"Household water demand, as with all water demand, tends to be very site-specific, influenced by a range of natural and socioeconomic factors. The demand relationship is represented graphically by the familiar demand curve, or algebraically as:

$$Q_w = Q_w(P_w, P_a, P; Y; Z)$$

where Q_w refers to the individual's level of consumption of water in a specified time period; P_w refers to the price of water; P_a denotes the price of an alternative water source; P refers to an average price index representing all other goods and services; Y is the consumer's income, and Z is a vector representing other factors, such as climate and consumer preferences."

Source: Young (1996)

When the demand for residential use cannot be estimated from observable consumption and prices (due to a lack of data, for instance), there are other options for water valuation like hedonic estimations and contingent valuations methods, which are more commonly used for other types of water service valuation.

Hedonic price estimations

Sometimes, although there is no market for the water service to be evaluated, these benefits are embedded in other markets. For instance, real property transactions near an aesthetic water place will somewhat incorporate these benefits, although bundled with other attributes of the property.

This method is based on the assumption that the price of a marketed good is a function of its different attributes, and an implicit price exists for each of these. A further description of this method (and its limitations), as applied to water resources, is exposed in Box 3.9.

Box 3.9: Hedonic price estimation for natural resource valuation

"In natural resource and environmental economics, the hedonic pricing method has been most frequently applied to the residential housing market, for analysis of real property (land) sales price data exhibiting differing but measurable environmental characteristics (e.g. varying water supplies of water qualities) (…)

"As an example of the hedonic approach applied to water resources, consider the case studied by D'Arge and Shogren (1988). A pair of neighbouring lakes in Iowa, which are popular for water-based recreation, exhibited sharply differing water qualities. Sales prices for recreational homes on the lake with better quality water were higher, controlling for other factors, than prices of homes on the other lake (…)

"Estimation of economic values of environmental resource with hedonic methods is quite difficult in practice, and the technique is subject to serious limitations. Although experience with real property market shows that relatively strong conclusions can be reached regarding the value of structural attributes of the property itself (…) the value of environmental attributes – whose nature, future status and impacts may be imperfectly perceived by market participants – are more difficult to isolate."

Source: Young (1996)

Travel cost methods

Most amenity and recreational water sites charge a fixed entrance fee to users; thus, there is no variation according to demand for those services. This makes estimation of demand for these services problematic. Travel cost incurred by visitors is an indirect way to estimate this demand, since there is variation among visitors in travel expenses – according to distances and other characteristics – and also in consumers' time opportunity cost values, which will signal differences in willingness to pay for the service.

When this is possible (using special surveys, for instance), a demand for this type of service can be inferred; and consumer surpluses (the area below the demand curve and above travel costs) are estimated, giving a measure of total benefits generated by the site. These benefits are measured against the costs of managing and maintaining the site, or against the costs of improving water quality or other water-related services.

Contingent valuation methods

These methods have become very popular to estimate the values of water-related goods for which there are no markets, or when the water service is to be created by a new project or policy (it could be a set of regulations to preserve water quality, for instance). Since consumers do not have a clear idea about the nature of the service, the researcher has to explain it very clearly and ask questions regarding the willingness to pay for these services.

Different techniques are available to define the framework in order to avoid potential biases when asking consumers about their willingness to pay. Pictures and graphical material on the considered changes are important, so that surveyed persons can have a better idea about the topic they are asked to value. The way in which willingness to pay is elicited is also a very important part of contingent valuation methods. There is ample evidence that respondents will seriously bias their responses according to the information that they themselves get from the surveyors. For instance, the surveyor can suggest a starting price for the service, and respondents may use that as reference point for their valuation. This leads to methods in which the starting point is randomly assigned to surveyors (within a given range) in order to reduce the starting point bias. Advantages and limitations of the approach are presented in Box 3.10.

Box 3.10: Pros and cons of Contingent Valuation Method (CVM)

The principal advantage of the Contingent Valuation Method (CVM) is that it can potentially measure the economic benefits (or damages) of a wide assortment of beneficial (or adverse) effects in a way that is consistent with economic theory. A major plus is the possibility of evaluating proposed, in addition to already available, goods and services. The technique can be addressed to values, such as non-user values that cannot successfully be dealt with by any other approaches… The method has been successfully adapted to studying demand for domestic water and sanitation improvement in rural villages in developing countries (Whittington and Swarma, 1994).

There is a downside, as well. Although a contingent value study can be an effective measurement tool where no other technique applies, if one hopes for an accurate result, extreme care must go into the design and conduct of the survey… Questionnaires must be carefully formulated and tested, and if not a mail survey, interviewers must be carefully selected, trained and supervised. Econometric analysis of the data may present challenges. CVM studies (if properly performed) require significant research effort, well-trained staff and a budget to match.

Source: Young (1996)

Valuation of water as an intermediate good

Often, water is not directly consumed but it enters a productive process like agriculture, industry or hydroelectric power generation, which are examples of intermediate good use. In this case, the demand will reflect what we consider as producers' behaviour in 3.2. in this chapter, the so-called input demand curves. The producers' demand for an input is its marginal value of product (MVP), as producers will demand an input according to its marginal productivity. When there is not a market for the input, like for water, special methods of valuation are needed, generating so-called **shadow prices** for water. Two methods for valuing water as an intermediate good are mostly used, namely the hedonic price method (when a surrogate market can give information on MVP of water), and the residual imputation approach.

The "residual" method is frequently used, particularly to value irrigation water. Using a production function approach, in this method a total production function is estimated, and also the marginal contribution of all relevant inputs (including water) are estimated with production data and prices for the non-water inputs. If these prices correctly reflect their scarcity (well-working markets), the remainder of total value is considered the contribution of water to total value.

Question from the ground

Which water valuation methods do you find more useful for tackling water problems in your country? Why?

3.6 Evaluation criteria to design economic instruments

The evaluation criteria used in designing economic instruments are economic efficiency, equity, administrative feasibility and political acceptability.

1) Economic efficiency

Economic efficiency in resource allocation is an important objective of a pricing policy. If properly structured, economic instruments will ration demand, provide incentives to avoid waste, give signals to the supplier concerning the optimal scale of production, provide resources to the supplier to increase supply, and give consumers information about the scarcity of the resource.

To ensure economic efficiency, user charges such as water rates should cover the real cost of providing water (including environmental externalities), and when possible, reflect the opportunity cost of the resource. Charging should be responsive to water scarcity, population growth and increases in income, since these changes inevitably result in higher water supply–demand imbalances.

2) Equity

When we speak of achieving equity in water, we are generally concerned with the situation of vulnerable groups of society excluded from access to basic goods and services (in this case, to water). A particularly acute equity problem is the case where the poorest group pays more per unit of water than all other social groups, which is a situation we find in urban sites with partial coverage of potable water. Other equity issues in irrigation include the downstream farmers who receive less water than promised, due to increasing losses in distribution; and marginal sectors on irrigated areas who are the first to suffer shortages when a drought strikes, for instance.

Among domestic water users, there are two dimensions of equity that are of concern to water policy makers, namely vertical and horizontal equity. Firstly, there is vertical equity whereby the incidence of water tariffs should be equitable between people of different income levels. Secondly, there is horizontal equity whereby the price is equal between people earning the same income.

Box 3.11: Difficulties in Implementing the Concept of Equity

There is considerable confusion over the use of the concept of equity because it is difficult to implement in practice. For example:

A few large users may dictate the system design capacity, one of the most important and costly design parameters for water systems, which makes it inequitable for smaller users who must share water costs.

Large users may also have high usage rates, high peaking requirements, or both. In both these cases, the majorities (small users) are actually subsidising the needs of a few large users, and an apparently equitable charging system is actually inequitable.

3) Environmental sustainability

By environmental criteria, we mean those concerned with the attainment of conditions for a sustainable exploitation of natural resources and the environmental assets valued by present and future generations to be properly conserved.

The relationship between environmental objectives and the functioning of water systems can be very complex. In an institutional context where environmental objectives are given no real expression either within institutions or among decision makers, the water sector will tend to reflect this situation and is very unlikely to produce positive environmental effects. For example, if the overall effect of economic policies is to favour rapid economic growth with intensive use of contaminating processes, the water sector will only amplify this, since water will be allocated to the activities favoured by these policies.

4) Administrative and political feasibility

Administrative and political feasibility are an important criterion in applying economic instruments, and it is advisable that it is not neglected. It is senseless to adopt economic instruments that are difficult to implement. For instance, water tariffs based on marginal cost pricing, which charges on the basis of each additional unit consumed, is administratively unfeasible in the absence of metering. The utilisation of user fees is a sensitive matter for most governments which want to control the rate of price inflation, and fear the political repercussions of price increases for basic services, since consumers are often quite emphatic in their opposition, at times even endangering political stability through riots (Bahl and Linn, 1992).

Question from the ground

To which of the alternative evaluation criteria would you give more weighting in designing economic instruments for IWRM in your country? Why?

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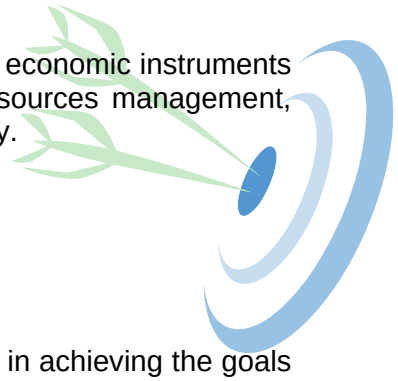
CHAPTER 4
APPLICATION OF WATER ECONOMIC INSTRUMENTS

Goal

The goal of this chapter is to introduce the application of water economic instruments that are aimed at achieving the goals of integrated water resources management, which include equity, efficiency and environmental sustainability.



Learning objectives

At the end of this chapter, participants will be able:

- To understand the importance of economic instruments in achieving the goals and objectives of IWRM and to tackle water management problems;
- To understand the evaluation criteria that may be applied in designing economic instruments;
- To understand the various types of economic instruments;
- To discuss multiple uses and sectors and how economic instruments are applied to reconcile competition for and allocation of water resources; and
- To discuss the pros and cons of economic instruments.

In this chapter, we will discuss the application of water economic instruments in relation to the goals of integrated water resources management. It starts by providing a broad view of the objectives of managing water and the two broad approaches for doing so. It then presents a brief discussion on the supply-side approach and the demand management approach to water management, considering the multi-sector use of the resource. This is followed by a brief discussion on the evaluation criteria that may be used for designing economic instruments. The types of economic instruments that are applied in water management are then discussed in detail. The chapter ends by examining how economic instruments are used to reconcile competition among multiple water users.

4.1 Management instruments: A broad view

With an IWRM perspective, the objectives of managing water are to *maximise economic and social welfare* in an *equitable* manner, without damaging *environmental sustainability.* The GWP Toolbox describes the spectrum of measures available for achieving these aims.

The two broad approaches are:

- Creating an *enabling environment* to support the various actors in the water sector in carrying out their functions (This entails economic stability, democratic policy-formation, appropriate water legislation and regulation, institutional reform, etc.)
- *Creating* ***inducements and incentives*** for private parties (firms, farmers and households) to align their behaviour with general social interest (This can

include *coercion and exhortation* by public authorities by legal, administrative and "propaganda" methods.)

These approaches normally complement and reinforce each other, though in some circumstances, they may be alternatives. The next section gives examples of policy options under these two broad categories.

Balancing supply-side approaches & demand management

As seen in Chapter 3, economic instruments will have important impacts on the ***demand*** for water resources and services. They work in tandem with interventions of other types, some of which act in other parts of the water cycle. ***Supply-side*** measures act on the production of water (e.g. by resource development and conservation, storage, transport and treatment), and often entail major physical infrastructural works. For water supply, it is also useful to distinguish ***distribution management***, from the point where water enters the distribution system to the point where it reaches the final consumer. Pressure and leakage are key issues in distribution management.

There is no hard and fast definition of *demand management* (DM). It relates to measures directly affecting users, at the point at which water moves from the public to the private domain (e.g. onto the user's property); and seeks to influence consumers' use of water. Economic instruments can be used to add to the effectiveness of demand management. Box 4.1 provides examples of the economic instruments and their application.

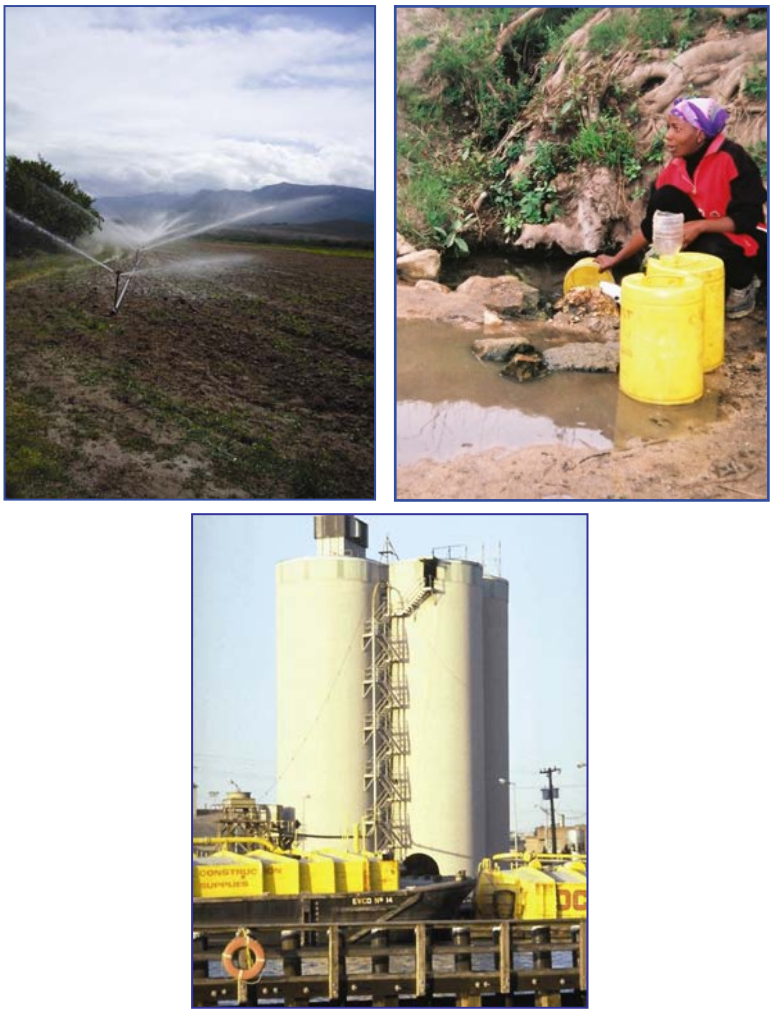
Box 4.1: Using economic instruments in water resources management

Economic instruments (tariffs, subsidies, cross-subsidies and other incentive-based measures such as water trading and effluent charges) are typically used to promote the efficient allocation and use of the water resource. Economic instruments may also be used to achieve the broader objectives of equitable allocation and the sustainable use of the water resource. Economic instruments work best when they complement (and are complemented by) appropriate policy, regulatory, institutional, technical and social instruments.

Multiple Uses and Multiple Sectors

Water is needed to ensure human survival, promote economic development, and foster environmental sustainability. Access to potable water is a basic need in all societies. It is essential for drinking and cooking purposes without which human health is compromised and survival is threatened. However, economic sectors of a country such as agriculture, manufacturing, mining and tourism all use water. Furthermore, the energy used by these productive activities may be derived from hydropower. Competition for water among domestic consumers, agricultural and industrial users requires a mechanism which can help ration water among water users (See Figure 4.1).

Figure 4.1: Different water users among whom water must be rationed, using economic instruments



Economic instruments can be used to promote a higher level of efficiency in the allocation of water among multiple users and sectors. Pricing is often used as a mechanism for achieving efficiency in water allocation and for avoiding wastage. If water provision is priced below its economic cost, there is no incentive to conserve water. As a result of under-pricing, water is not used efficiently within and among various sectors.

Economic instruments are also used to subsidise multiple users to ensure that equity is attained. Within sectors, there are users that are in need of subsidies. For example, poor domestic users are cross-subsidised by upper-income and middle-income households. Additionally, cross-subsidisation between sectors occurs, as in the case of industrial users paying higher rates to cross-subsidise the irrigation needs of farmers in the agricultural sector.

Before discussing in detail the various types of economic instruments that are used in water management, the evaluation criteria that are used to design economic instruments are discussed.

4.2 Types of economic instruments

The types of economic instruments that will be discussed in this chapter are water tariffs; irrigation water charges; abstraction charges (bulk water tariffs); sewerage effluent and wastewater charges; water subsidies; water taxes; and water market.

a) Water tariffs

Water tariffs are broadly defined as all charges and levies imposed on the user of a service, if such charges bear some direct relation to the provision of the service. The cost of abstracting, storing, transporting, treating and distributing water to major sectors such as households, industries and farmers, is recovered (partially or wholly) from charging tariffs to the users.

Objectives of Water Tariffs

The design of a tariff can take different forms, which will depend on specific objectives. Box 4.2 shows the many objectives a water tariff can be designed to achieve. The "best" tariff design for a particular community and situation is one which strikes the most desirable balance among the objectives that are important to that community (Boland, 1997).

Consumers and suppliers of water have different expectations of water tariffs. As Rogers *et al*. (2002) note, consumers want high water quality at an affordable and stable price. On the other hand, suppliers like to cover all costs and have a stable revenue base. The level and structure of water tariffs have far-reaching expectations in that water-related fees can be expected to generate revenue, improve efficiency of the supply and supplier, manage demand, facilitate economic development and improve public welfare and equity (Potter, 1994).

Box 4.2: Desired objects of tariffs

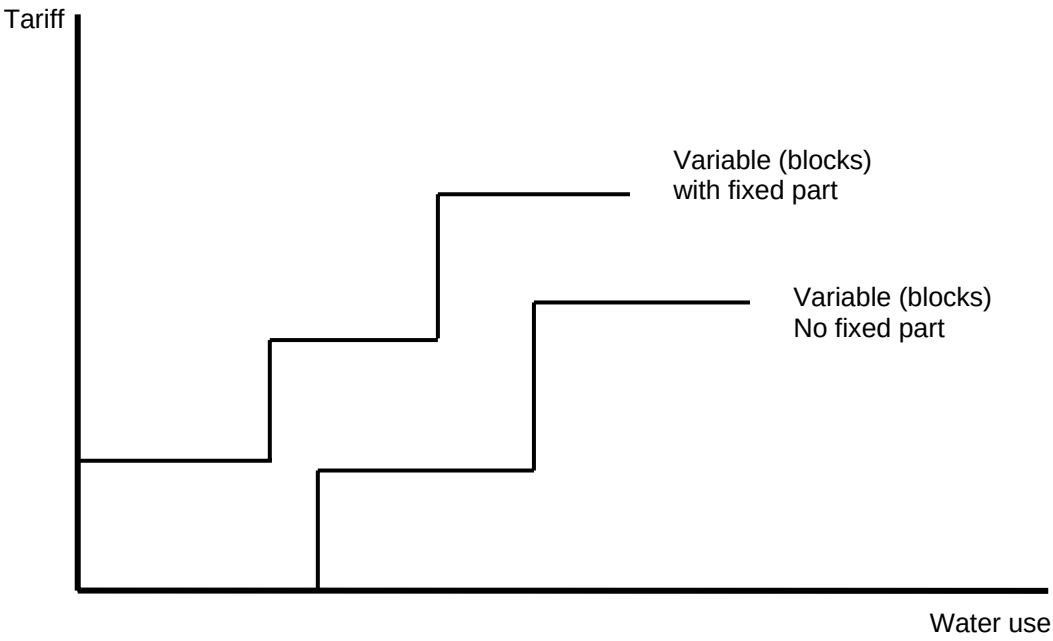
- The tariff must maximise efficient allocation of the resource;
- Water users should perceive the tariff as fair;
- Rates must be equitable across customer classes;
- They must bring sufficient revenue;
- They must provide net revenue stability;
- The public must understand the rate-setting process;
- They must promote resource conservation;
- Tariff-setting process should avoid rate shocks;
- They must be easy to implement;
- Water must be affordable;
- Rates must be forwarding looking;
- The rate structure must attempt to reduce administrative costs;
- They must include environmental costs;
- Water prices must also reflect supply characteristics like water quality, supply reliability and frequency of supply;
- Tariff structure must vary depending on consumption measurability;
- More sophisticated rate structures may also account for daily peaks and seasonal variations in water demand.

Source: Rogers *et al*. 2002.

Types of tariffs

There are three main dimensions that define types of water tariffs: (i) if the tariff is directly linked to water consumption (variable) or not (fixed); (ii) if it is a combination of variable and fixed parts; and (iii) if the tariff level changes as more water is consumed (generally increasing or progressive system) in which the change can occur in blocks. The two most important types of water tariffs with variable components are shown graphically in Figure 4.2.

Figure 4.1. Main types of water tariffs



A ***fixed rate tariff*** (which does not vary with use) will suffice to raise revenue, but will have difficulties in influencing water demand and avoiding water waste.

A ***variable (volumetric) tariff****:* Users pay strictly according to what they consume. It requires metering (or other cruder methods of measuring usage). This may not be necessary or feasible in situations such as rural connections or the supply of low volumes to poor urban users. Generally, it is used with variable blocks, since these allow the tariff to be increased or decreased along blocks. These types of tariffs are used by water utilities in cities, generally with a small fixed amount for the connection service.

Fixed and variable tariff (or two-part tariff): In this case, users pay one amount independently of consumption, and also per unit consumed. The variable part can be also designed by using blocks to allow for changing charges along blocks. This is preferred in some irrigation systems with good water measurement, and also in bulk water tariffs in which there is a significant part of costs that is fixed.

Box 4.3: Two-part tariff system

Several OECD countries (for example Australia, Austria, Denmark, Finland and the United Kingdom) with successful water pricing schemes, use a two-part tariff structure. Examples of developing countries that have successfully used the two-part tariff are South Africa, Argentina, India and Singapore. This has fixed and variable elements. One of the main advantages of the two-part tariff system is the stabilised revenue base it affords the supplier. The fixed element protects the supplier from demand fluctuations and reduces financial risks. The variable element charges the consumer according to his consumption level and therefore encourages conservation.

Source: Rogers *et al.* 2002

Box 4.4: Increasing Block Tariff (IBT) Structure

The increasing block tariff is a more refined form of the two-part tariff system. IBT provides different prices for two or more pre-specified blocks of water. The price rises with each successive block. The utility must decide on the number of blocks, volume of water use associated with each block, and price to be charged for each block when designing an IBT structure (Boland and Whittington, 1998).

IBT is a progressive tariff that allows the utility to provide a lifeline to the poor at below-cost rate, and charge higher prices for use beyond this minimum volume. This subsidy allows the poor to access water and it is therefore acclaimed for improving equity, which will be discussed in more detail in a subsequent section of this chapter.

b) Irrigation water charges

In almost all ***public*** irrigation schemes, the prices charged for water are well below full cost recovery levels and usually only a fraction even of the recurrent costs of operation and maintenance. Many farmers (large or small) pay no formal charges for their water, though they may make informal payments to obtain access to public irrigation services. In comparison, farmers with their own water sources pay the full cost of water, e.g. from groundwater pumping (unless energy is subsidised).

Increasing the rate of cost recovery is particularly difficult in public irrigation schemes, and the present meagre levels of cost recovery result in a vicious cycle of build–neglect–rebuild.

Water users are potentially a very large source of finance for infrastructure, through water charges. These revenues are important both to raise essential funds for the operation and maintenance of systems, and also because they turn passive recipients of water into paying customers, potentially with an important voice in how services are provided.

However, doubts have been raised over how far tariffs can influence farmers' use of water. Charges would need to be much higher than at present, which would run into stiff resistance. There would also have to be some credible system of measuring water use, and an effective collection system. Farmers may well be more willing to pay for a decent service than politicians are to charge them. But where service is poor; where revenues are apparently wasted on such things as a swollen bureaucracy; and where collectors are corrupt, the willingness to pay tends to be low (See Box 4.5).

Box 4.5: Will farmers pay more for water?

Better cost recovery is essential, in order to provide revenues for the efficient operation of schemes and to contribute to investment outlays. However, its success is likely to depend on the following:

- The recurrent cost of schemes should be kept as low as possible, to minimise financial burdens on users. Minimising O&M costs should be a selection criterion of projects.
- Irrigation water charges are unlikely by themselves to induce more efficient agricultural water use, unless they are raised to unrealistic levels. Volumetric pricing is feasible in only a minority of cases.
- Water users need to be convinced that the financing system for irrigation is fair. The timing of payments should also recognise the seasonal cash position of farmers.
- Users are more likely to pay higher charges when they foresee that this will be linked to improvements in the quality of service. This is more likely to happen where irrigation agencies have some financial autonomy and are allowed to retain all (or part of) revenues, and where farmers have a voice in operational decisions.

c) Abstraction charges or bulk water tariffs

A water abstraction charge or tax is levied on the off-take of water from surface or ground sources. Where accurate measurement and monitoring are feasible, the tax may be charged in proportion to the amount of water withdrawn. When this is not feasible, the abstractor may be allowed to take water up to a specified limit, and pay a licence – subject to periodic monitoring. It is advantageous for surface and groundwater taxes to bear some relation to one another, in order to discourage excessive drawings on one or the other.

In countries where groundwater is widely used, the price of electric power and fuel used for pumping can act as a proxy for water abstraction charges.

Apart from its role in raising finance and controlling withdrawals for environmental reasons, the abstraction charge has been credited (e.g. in Germany) with capacity building in local water administrations, and in strengthening data collection on water resources. As with other applications of pricing in environmental policy, the abstraction charge only works in conjunction with a good system of monitoring and compliance enforcement.

Such types of water pricing are becoming increasingly important for IWRM, being applied by different sectors. The charge can be a fixed amount or depend on total use from each sector. It may include considerations about water allocation and environmental impacts of water-using sectors. Most recent water legislations are incorporating this concept as a key economic instrument to influence water allocation and finance multi-sector water management.

d) Sewerage, effluent & wastewater charges

Where public sewerage networks exist, it is sensible to encourage households and businesses to connect up and use them. The extra cost on the system from additional users is normally insignificant, except for major industries; and there are public health benefits from using central collection and treatment rather than private solutions. It is also important to maintain an adequate throughput for sewers and wastewater treatment plants to function properly.

Hence, sewerage charges (which are normally added as a surcharge to freshwater tariffs) should not be disproportionate; otherwise, users – particularly industries – will turn to other options of pre-treatment or disposal

which are less desirable or efficient. There have been cases where exorbitant trade effluent charges led to a demand reaction from many industrial users, which in turn led to a decline in the use of public systems, operational problems for wastewater treatment plants, and a rise in unit costs to be recovered from households.

In the case of trade effluent, charges are only effective where there is an effective system of measurement, monitoring and enforcement.

e) Water subsidies

Water subsidies should be used to promote social equity, growth, employment and increased incomes in particular economic sectors. A case for subsidisation and social equity occurs where the water service primarily benefits the individual user, but its consumption needs to be encouraged for public benefit or saving. Approximately 20 to 40 litres of water per person per day (lcpd) is sufficient to meet essential needs and to attain the main health benefits of water use. Consumers should therefore be given an incentive to consume at least this amount of safe water (if they are not willing or able to do so) at their prevailing incomes and marginal cost price (See Figure 4.2).

Figure 4.2: Consumers must have access to a basic quantity of water for human health and survival.

However, there is growing awareness that subsidising water use is not necessarily the best way to achieve sectoral economic or social objectives. Rogers *et al. (2002)* note that some economic and social goals are harmed over the long run by using subsidies. This applies to instances where subsidies are used to support ailing industries that invariably contribute to significant environment damage (Potier, 1996). Subsidy removal has been recommended by the OECD (1998) to complement policies that internalise social and environmental costs of harmful activities. Nonetheless, in many countries, cross-subsidies from industrial users to farmers and households are still used.
Subsidies to water users are management tools that can be justified on the grounds that:

- Many users are poor and could not afford cost-recovering tariffs (This is particularly true of the unserved populations targeted by the MDGs.);
- The use of safe water sources and basic household hygiene should be

promoted since they improve public health. Likewise, encouraging the safe disposal of sewage has environmental and public health benefits. These reasons justify subsidy of water/wastewater services.

- Subsidies can be used to accelerate the uptake of water-saving or pollution-reducing measures by both firms and households.

The question is who & what to subsidise.

Subsidies to entire *public utilities* have several disadvantages. They can undermine the drive to efficient commercial performance; they are dissipated throughout the organisation in unaccountable ways; they are often unpredictable, causing the utility to exist on a hand-to-mouth basis; and they create political dependency, which is invariably exploited by politicians.

Subsidies may compensate for (and perpetuate) inefficiency and waste, in which case there is no conceivable justification for continuing them. Or they may offset tariffs at sub-economic levels. Countless studies (Komives, et al, 2005) have shown that the benefit of subsidies always migrates towards the more privileged consumers – those already with connections, or with political influence. In many cases, "subsidies" accrue inadvertently to firms and individuals who do not pay their bills.

Subsidies create a mentality of dependence which is hard to break and which becomes counter-productive. It is increasingly argued that the way forward to achieving the sanitation MDGs is not through subsidising hardware or infrastructure, but through promoting demand (Box 4.6.).

Box 4.6: Promoting household sanitation: slabs, subsidies or persuasion?

The traditional approach to sanitation has focused on *supply*, and financing has been viewed largely as an issue of *subsidising technical solutions.* This has led to the wrong kinds of facilities being provided, which are unused, neglected or even diverted for other purposes (e.g. storage). A more promising approach is to:

- examine the real demand for sanitation in specific locations;
- promote this demand through individual incentives or community pressure;
- devise appropriate and cost-effective solutions; and
- use grant funds to leverage private and community contributions.

The Ethiopian National Sanitation Strategy (2004) has developed financing principles consistent with the above approach:

The safe disposal of human waste and household wastewater has large external benefits to society, which would of itself justify either high charges to households (on the Polluter Pays Principle) or public subsidies for sanitation targeted at poor communities. Subsidies may have perverse side effects. They may distort the market in favour of inferior or unwanted solutions, or they may even discourage demand. They may be misused ("subsidising toolsheds, not toilets") or misappropriated through corruption. Subsidies are difficult to sustain in poor countries, and donor agencies cannot always direct budgetary aid accurately to their intended beneficiaries. The choice of *whether, how, and how much to subsidise* should be taken pragmatically.

The need for subsidy can be minimised by the choice of low-cost technology and providing credit lines to satisfy affordability. One of the most successful programmes of latrine construction (the Total Sanitation movement in Bangladesh, Ethiopia and other countries) uses little or no direct public subsidy.

Subsidising the credit terms of finance for the water sector is also unwise. Large sums provided by donor agencies to microcredit schemes (many of them operated by NGOs, in the form of "evergreen" subsidies) have risked crowding out commercial finance and preventing microcredit schemes from becoming self-financing.

Box 4.7: Smart subsidies are targeted, transparent and tapering:

Targeted to population groups, or to purposes, that are specifically intended to benefit, rather than scattered across the population at large. Targeting concentrates limited financial resources on those most in need. Ideally, subsidies are given through the social welfare system, where this is sufficiently developed (Chile is a case in point).
Transparent so that they are accountable to citizens, users and taxpayers: This is best achieved through budgeted sums paid in the context of performance agreements between the sponsoring ministry and the utility or service provider.
Tapering – Where the aim is to diminish subsidies over time, and eventually eliminate them: This creates signals and incentives for progress towards commercial and financial reforms with the eventual aim of financial self-sufficiency, where this is feasible (e.g. for urban services).

There will be countries and circumstances where full financial cost recovery is a more distant goal. Various kinds of *cross-supports* are possible, e.g. from richer to poorer, larger to smaller consumers, from urban to rural, industrial to household, etc. In economic terms, cross-subsidies are second-best solutions since they produce distortions in consumption. But they are widely resorted to as pragmatic solutions.

f) Pollution taxes

Many public and private investment projects adversely affect water quality and degrade aquatic ecosystems, but many countries do not have standards to control water pollution or the capacity to enforce existing legislation. Some countries levy environmental taxes on wastewater effluent discharged directly into natural watercourses. This practice is based on the Polluter-Pays principle. Establishing the appropriate standards to apply pollution taxes requires careful analysis of the costs and benefits, given the high costs of clean-up operations and monitoring of enforcement. Moreover, for it to work well, there must be a public disclosure of effluent discharge data.

The design of the pollution tax is important if any gains are to be achieved. The structure and rate of the pollution tax is usually designed based on the concentration of specific pollutants, and is intended to and therefore helps encourage in-plant treatment prior to discharge. In effect, it reduces wastewater treatment costs. It is also argued that the tax structure should also provide incentives for the release of adequate amounts of clean effluent, which would help maintain river flows and dilute polluted wastewater. A different kind of tax is that which is levied on activities or products responsible for water contamination, e.g. dairy cattle and nitrogenous fertiliser.

The optimum pollution tax from an economic point of view is one that induces a polluter to undertake abatement up to the point where the (marginal) cost of further abatement is just equal to the cost of the environmental damage which is avoided. At this point, the polluter will be indifferent between paying the tax, and undertaking further abatement. From society's point of view, there will be neither too much nor too little pollution (zero pollution is economically "inefficient").

g) Water Markets

The provision and some of the production of pure public goods are essentially the responsibility of the government, while pure private goods can be handled efficiently by markets. Most water activities, however, are not strictly public or private goods. They require some form of government regulation or involvement if the resources are to be used efficiently.

In most countries the state owns the water resources and the hydraulic infrastructure, and public officials decide who gets the water, how it is used, and how much will be charged for it. But costly inefficiencies in the supply and use of water support a shift from government provision to a market-based approach that is likely to be more effective and less wasteful (Thobanl, 1997).

Markets can allow rapid changes in allocation, in response to changing demands for water, and can stimulate investment and employment as investors are assured of access to secure water supplies. However, economic instruments and water markets cannot always achieve these, unless water laws and regulations are in place.

Buying and selling *rights* to water is a potential tool for water management in three situations:

- Ensuring scarce water is transferred to uses that are more valuable: This happens when farmers sell their rights (on a once-off, seasonal or permanent basis) to other farmers, municipalities, or users in other sectors;
- A cost-effective way of getting access to increased supplies, compared with other options such as new resource development: Cities in arid areas may be able to buy out farms with water sources or access rights at a lower cost than generating water supply by other means; and
- Extracting public authorities from unsustainable supply commitments: In some regions (e.g. some Western states of the USA), farmers (or more rarely, other types of users) have historical entitlements to receive public water, which are increasingly difficult or expensive to honour. Buying out these commitments would be easier where there are markets for these rights.

Markets are the practical embodiment of the principle of *opportunity cost*, which is otherwise difficult to include in water prices. Through markets, water migrates from uses where it is valued less, to where it is valued more highly. The opportunity cost of water to a specific user is its price in its next most valuable use – if this is greater than that in its current use, the seller, buyer and society as a whole profit from the trade. See Box 3.6 in Chapter 3 to get to know more about the experience of water markets in Chile.

The preconditions for water markets are:

- Legal recognition of the seller's rights to the water, separate from ownership of land, and freedom to sell and buy these rights;
- Physical possibility to convey the water in question between different users;
- Protection of the rights (including compensation provisions) of third

parties and the environment where these are likely to be affected by the trades; and
- A sufficient number of potential trades to create a well-functioning water market and to avoid monopolistic control.

Creating markets for *pollution* is a separate, and more problematic, issue. The concept of tradable "permits to pollute" water developed as an analogue of the far more widespread and successful markets for air pollution (*emissions trading, carbon trading, etc*). Unlike for air pollution, however, the concept has had little success in the water arena.

The rationale for tradable permits (TPs) is that they provide an economically efficient and flexible method of implementing environmental water standards. A baseline level of pollution is determined and attributed to existing polluters. A desired level of water quality or pollution target is set by environmental authorities, and polluting firms are allowed to trade their "entitlements". Firms that feel unable to meet the new standards except at excessive cost may buy their entitlement from others that can generate pollution "credits". Polluters are penalised, while "virtuous" firms are rewarded; and the desired level of pollution – which should be reduced over time – will be achieved more efficiently than with *command and control* measures applied to each specific firm.

Question from the ground

Which economic instruments are applied in your country? Are they achieving the goals and objectives of facilitating IWRM implementation?

4.3 Pros and cons of economic instruments

Using prices and markets to influence the behaviour of water users has the following advantages:

- They are flexible, compared to administrative regulations (*command and control*). Pollution taxes, for instance, enable a polluting firm to continue operations, but at a cost penalty, and allow the firm to choose the methods by which it reduces pollution;
- They penalise polluting firms or heavy water users in conditions of scarcity. Conversely, they reward or give market advantages to individuals and firms that modify their usage. These are likely to be those that can do it more efficiently, at lowest cost to society;
- The incentives that they provide are continual, whereas many "command and control" methods provide a once-off sanction. Economic incentives are "technology forcing", since they provide a permanent incentive to conserve water or reduce pollution; and
- They can be used to generate revenue.

Their main disadvantages are:

- Prices are an uncertain method of achieving a desired amount of conservation or pollution abatement (On the other hand, tradable permits operate within a system of regulations that place a ceiling on total emissions, thus restoring certainty.).
- Taxes and charges raise the costs of households, farms and companies, which can be inflationary, and can attract political opposition. This can be

mitigated by lowering taxes and charges elsewhere, making the measures "fiscally neutral". It should also be recalled that regulations have a cost to water users, which are less transparent, but real, nonetheless.

Where there is market failure and economic instruments must be made effective, rules and regulations may be needed to govern water management.

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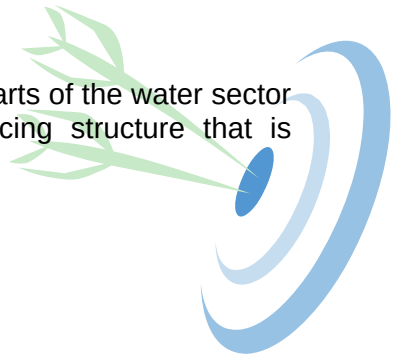
CHAPTER 5
INTRODUCTION TO WATER FINANCE

Goal



The goal of Chapter 5 is to explain how the main constituent parts of the water sector obtain their finance and to consider how a national financing structure that is coherent, adequate and sustainable can be put together.

Learning objectives

At the end of this chapter, participants will be able:

- To understand the variety and complexity of a national water sector and the specific financial needs of its component parts;
- To differentiate financial and economic instruments; and
- To adopt a critical approach to different financing options;

5.1 Introduction

This chapter deals with methods of financing the water sector. It begins by drawing a distinction between financial and economic instruments. It continues with a breakdown of the different parts of a water sector and outlines the main types of cost to be funded. It concludes with some proposals that can guide a financing strategy, illustrated with a case study from two European countries.

5.2 Financial and economic instruments

Some instruments can perform both economic and financial purposes:

- ***Economic*** instruments are those that influence users' behaviour towards water and the allocation of water resources.
- ***Financial*** instruments generate financial revenues for the operation and development of the sector.

However, the two effects may overlap, and the same instrument may perform one purpose or both purposes in different circumstances:

- Some of the financial tools used also affect the way water is used or managed.
- A water tariff raises revenue to finance the continued operation of water systems, but it can also influence consumer behaviour towards water, e.g. encouraging more careful use, and promoting conservation.
- Certain economic instruments such as subsidies and tradable "permits to pollute" are transfer mechanisms not designed to raise revenue but that are aimed at implementing environmental policies. However, from the viewpoint of

the water user or beneficiary, they can of course be viewed as sources of funds.

- An "optimal" tariff in classical economic terms is one that raises the necessary revenue with the slightest impact on consumption (least "distortion").
- A pollution tax, if it succeeds in its aim of eliminating pollution, will eventually raise zero revenue.

5.3. Finance for the water sector

The "water sector" includes all aspects of the development, management and use of water, as well as physical infrastructure. Other functions and services (planning, data gathering, policymaking, institutional support and reform, regulation, legislation, compliance, awareness-raising etc.) also need adequate funding (see Box 5.1).

Question from the ground

When do financial and economic aims diverge? Think and respond to this question with from-the-ground experience and application from your country.

Box 5.1: Catalogue of national water sector:

A nation's water sector comprises a range of functions and services. The starting point in constructing a financing strategy is to consider, for each part of the sector, its sources and modalities of finance, the financial status of the entities involved, and their estimated future financial requirements.

National sector policy setting & coordination
Strategic policymaking and planning, public information & stakeholder consultation, research, data collection & monitoring, legislation, emergency responses, allocation, etc; Funding of IWRM plans and processes

Environmental & economic regulation & performance monitoring
Setting and enforcing environmental and economic performance standards for water users and service providers

Water resource development & management
Development, management & protection of sources and catchments, flood protection, navigation, hydropower, environmental conservation (including wetlands), fisheries, maintaining water quality, pollution prevention, etc; Preparation of river basin development plans

Bulk water supply
Development and operation of major infrastructure for agriculture, industry, power, municipal and other uses

Distribution of water,
Storage, treatment, transport to local users, building & maintenance of supply networks, etc.

Household sanitation
The safe disposal of excreta and household wastewater to on-site facilities or, for more developed networks, to mains sewerage.

Wastewater collection, transport & treatment
Development and operation of systems to collect wastewater from households, industries and other generators; conveying it for safe disposal and/or treatment; disposal of sludge and re-use of treated effluent, depending on circumstances

In practice, financing of the water sector is uneven. Certain functions/services are easier to fund than others:

1) Easier to fund: Certain sub-sectors are defined well and provide clearly recognisable and saleable public services. These sub-sectors often have their own sponsoring public agencies (with regular budgeting, some financial autonomy and financial self-sufficiency, in some cases). For sub-sectors such as hydropower, navigation, urban water supply and the forestry element of catchment protection, funding need not be a problem.

2) More difficult to fund: Other sub-sectors such as irrigation and wastewater services tend to be underfunded in practice, mainly because of the difficulty of recovering costs from users.

3) More likely to be neglected & underfunded: Certain functions and services necessary for the smooth functioning of other parts of the water sector, which act as the cement for IWRM, tend to be neglected or under-funded. Such integrative functions as environmental protection, catchment management, flood protection, research, hydrological monitoring & forecasting, coordination, public awareness, stakeholder consultation and institutional capacity building are vital, but often neglected and under-funded.

Question from the ground

Which parts of your country's water sector are adequately funded? Which are not?

5.4. Which costs need to be funded, and from where?

Water services incur both regular and once-off financial costs, requiring separate financing provision. The two conventional cost categories are recurrent and capital:

Recurrent costs

Recurrent costs are the continual expenses involved in operating all parts of the water sector, including wages & salaries, fuel, electricity, chemicals, spare parts and minor capital items necessary to maintain and repair systems. Some recurrent costs are ***overhead*** items that are fixed and that do not vary with the level of service (e.g. administration salaries, office rent, research, monitoring, meter reading and routine maintenance). Other items are ***variable*** and rise and fall with the level of service provided (e.g. chemicals for treatment and electricity used for pumping).

Capital costs

Capital costs are for large items of investment, including:

- infrastructure (dams, urban distribution networks, etc.);
- resource development (e.g. protection of catchments and drilling groundwater wells)
- major repairs;
- modernisation (e.g. the upgrading of a water treatment plant); and
- rehabilitation of old or broken installations, etc.

These activities normally need specific financing provision. In a mature water system, the capital cost of water services are largely met from present or future user charges. In developing countries, government grants, soft loans and ODA (Official Development Assistance) are more commonly used.

In the 1990s and early 2000s, the sources of funds for *capital investment* in developing countries were broadly:

- domestic public sector 65–70%;
- domestic private sector 5%;

- international donor agencies and IFIs 10–15%; and
- international private companies 10–15%.[4]

For *recurrent cost* funding, the most sustainable source is user charges, including cross-subsidies between different consumer categories. Where governments are willing and able to subsidise water services, funding can also be made through annual budgets[5]. Comprehensive and accurate data on the balance between these two sources is not available.

In "mature" water economies, integrative functions eventually get financed by a mixture of improvisation and the evolution of policies and institutions over time. In countries evolving towards IWRM, the institutional and financial arrangements for integrative functions may not be in place and need to be planned, possibly from scratch. The preparation of IWRM plans, the involvement of the many stakeholders, and preparing for the necessary reforms to the governance of the sector are themselves water sector functions that need to be financed.

5.5. Building a financing strategy for IWRM

Water institutions are highly country specific, and their financial architecture must be tailor-made for each case. There are no universally valid blueprints, but a few common sense principles can be offered for consideration when putting together a strategy for water financing:

- ***Using public finance for public goods***. Certain activities possess clear "public good" features and have strong externalities (e.g. research & information, flood control, forestation, catchment protection, policy formation and protection of wetland biodiversity). There is a strong case for continuing to use public funding for these activities – which should have priority where budgets are tight.

- ***Recover costs from users for directly productive services***. Introduce charges for the use of water services where these are affordable and where the services are used in a commercial or leisure context. Water management agencies may be able to *bundle* profitable and unprofitable services together in order to cross-subsidise the latter. For household water and sanitation, tariffs need to be designed with affordability in mind. If subsidies are used, they should be targeted to those most in need. Farm water subsidies are a special, and difficult, case.

- ***Appropriate delegation of financial powers to sub-sovereign & local bodies***. (e.g. setting tariffs, contracting loans, issuing bonds, levying pollution charges, issuing private concessions and dealing directly with foreign banks and agencies) This is in line with the widespread delegation of service responsibilities to sub-sovereign agencies. There is a strong case for accompanying their responsibilities with the necessary financial powers and responsibilities to make delegation effective. Such powers will require a major effort of local capacity building in many countries, with appropriate support and controls from central government. Financial delegation should be subject to

[4] Since then, the share of international private cost has fallen; but in some countries, local private companies have grown in importance.
[5] Deferred maintenance, delayed payments to suppliers and even barter are other common hidden means of finance.

national macroeconomic imperatives and will need to be subject to Treasury rules – It is not appropriate in every case.

- ***Increased self-financing of service providers***. Potentially self-financing projects and institutions should be encouraged to improve their finances and attract a wider spread of funds. Peer group comparisons of performance should be used. Credit-rating agencies also have a useful role in introducing transparency to the financial performance of public agencies.

- ***Take-up of external grants***. It is sensible to maximise take-up of available grants before seeking other financial sources. However, official development assistance (ODA) should be used to leverage other sources and to create incentives (e.g. through output-based aid), and should avoid creating aid dependency and reducing the pressure for reforms that are essential in the long run.

- ***Co-financing should be sought for transnational projects and those with international benefits***, e.g. transboundary schemes and projects with a "global" dimension. The case for this is greater where upstream activities, or downstream environmental standards, impose additional costs on the country concerned.

- ***The cost of multipurpose schemes can be shared with other sectors*** where water resource management creates other products and services (e.g. hydropower, flood protection, irrigation and recreation).

- ***Some externalities of water can be captured in monetary form and the proceeds applied to IWRM***. Water may be both the victim and the perpetrator of environmental and social "bads". According to the Polluter Pays Principle, the release of untreated effluent into watercourses should be taxed. The proceeds may be recycled into the water sector, e.g. through an Environmental Fund, or through specific grants and loans for wastewater treatment and remediation of watercourses. The water sector may also benefit from payments arising in other sectors (and other ministerial budgets), e.g. the many forms of environmental stewardship payments to farmers to practise a different kind of husbandry (less livestock, use of organic fertiliser and use of set-asides), which imposes lower water treatment or storage costs.

- ***Partnerships (between governments, external agencies, NGOs, private operators, not-for-profit foundations, community & civil society organisations, etc.) are a good way to tap new sources of finance***. But they should observe the principles of comparative advantage and appropriate division of risk (risks should be borne by the party which can best manage them, and/or mitigate them at the lowest cost). The design of some PSP projects in multipurpose hydro projects, and in municipal Watsan, has not been ideal (e.g. private partners have been left with risks they have managed with difficulty or at high cost). A specific kind of partnership is between water utilities and operators to provide peer support (e.g. through the new Water Operators' Partnership hosted by UN Habitat). If successful, these partnerships should improve access to finance.

- ***Tapping finance from commercial sources*** is a logical progression for water agencies or service providers that have achieved a sufficient degree of

autonomy, capacity and creditworthiness (see Box 5.2). Several sources are available, each with pros and cons (e.g. loans from commercial banks, International Financial Institutions, bond issues, private equity and microfinance agencies). Central government and external guarantees & insurance techniques can improve terms of access to these sources.

Box 5.2: Clarifying basic financial terms

Investors and lenders
An investor shares the risk of a project or company, usually through the purchase of equity shares. A loan is not an investment in the normal sense of the term. Banks do not invest, except when they buy equity.

Private finance
Lenders and investors, and likewise borrowers and investees, can be from either the private sector or the public sector. A private bank may lend to a public water utility, and a public corporation may take equity in a private water company. A municipality or public corporation may issue bonds which are bought by private finance institutions. Alternatively, a private company's bonds may be taken up by public. To complicate the picture further, some companies and banks have a mixed ownership. There are many hybrid forms of finance. It is clearer, and less emotive (given the passions surrounding "privatisation") to refer to *commercial finance*, except where private equity is specifically intended, or where equity and commercial finance is being introduced into public projects through various kinds of PSP (Private Sector Participation)

Private Sector Participation (PSP)
There are a number of ways in which private businesses can be involved in running the water sector, ranging from outright ownership of assets, through concessions, leases, operation and management contracts, and sub-contracting specific functions. Concessions, in turn, can take many forms, depending on whether they are for whole systems or for stand-alone assets such as treatment works (for which BOTs are increasingly common. This topic is dealt with further in Chapter 7.

Box 5.3: Financing the water sector: key messages

The ideal kind of commercial water finance is long-term, low-interest loans, available in local currency for sub-sovereign borrowers.

The most important features of water financing systems are that they should be coherent, sustainable, and deliver adequate funding to all parts of the water sector that need it. Financing systems do not necessarily have to be monolithic, logical or "integrated". The case study below indicates how two "mature" water economies go about securing finance for their water sector.

The principles seen in this section can be used in drawing up national water financing plans. The actual building blocks of such plans are the specific instruments that are described more fully in Chapter 6, and briefly introduced in the final section below.

5.6. The range of financial instruments

Ultimately, services are paid for by consumers or taxpayers in charges recovered from water users, or subsidies received from national governments or external aid agencies. Voluntary charitable contributions from individuals channelled through NGOs are another source which is minor in overall size, but important for specific projects and some countries. All loans and private equity investments have to be serviced from future revenues or taxes – They are not alternatives to tariffs and subsidies, but merely ways of deferring the impact of these financial costs on society.

The different financial instruments available can be considered in five broad categories:

- Charges for use or benefits
- National or local government grants or other support
- External grants (ODA)
- Philanthropy
- Commercial loans and equity

Examples of each are contained in Box 5.4. The following chapter (Chapter 6: Application of Financial Instruments) discusses these options in more depth.

Box 5.4: Instruments for financing the water sector

i) Charges for the use of water and water services
- Water abstraction charge
- Water tariffs for households, industries, farmers and other major users
- Sewerage & effluent charge
- Water pollution charges and taxes
- Licence fees & charges for use of specific services
- Flood protection levies

ii) National government grants, soft loans & guarantees
- Payments from national, state or municipal budgets
- Financial intermediaries and development banks

iii) External grants and concessional loans (ODA)

iv) Philanthropic agencies & partnerships
- Partnerships involving NGOs and civil society groups

v) Commercial loans, equity and PSP
- IFI loans
- Commercial bank loans and microfinance
- Bonds
- Private equity
- External guarantees and risk sharing

vi) PSP contracts of various kinds (BOTs, concessions, etc.)

5.7. Case study: Two examples of coherent financing

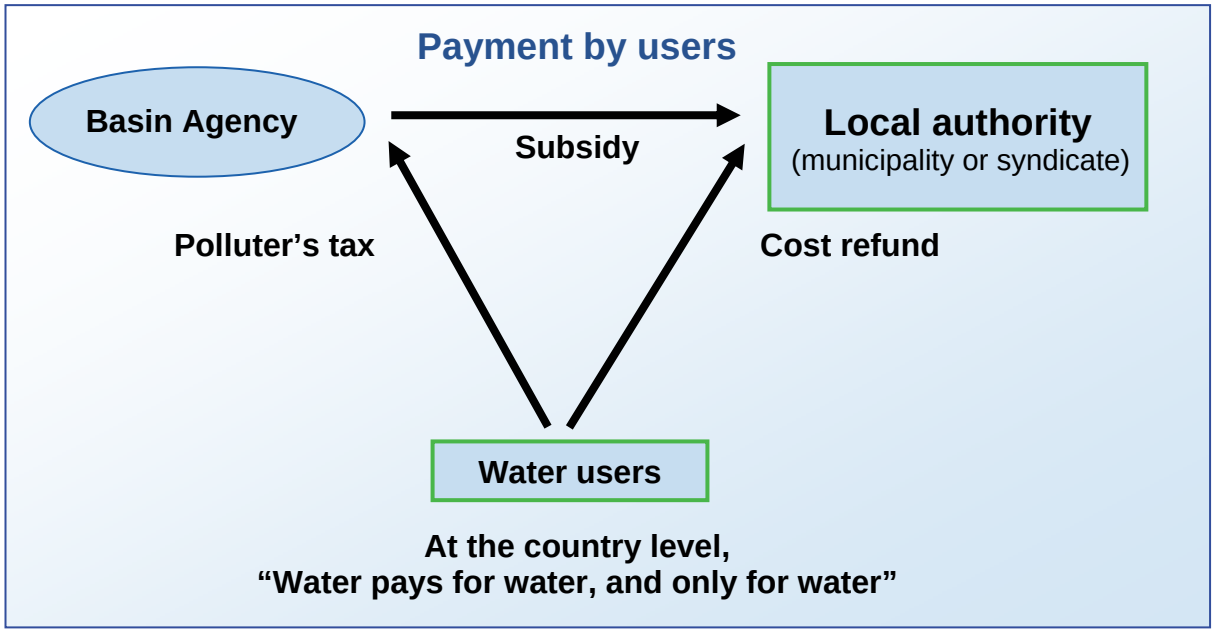
Case 1: France: "Water pays for water"

Water policy formulation, legislation and regulation are funded from national budgets. Six regional water agencies (*Agences de l'Eau*), corresponding to the major river basins, manage water resources, including abstraction and discharges.

Each agency has a Council (water *parliament*) to review and vote on spending programmes. The Councils include consumers as well as other regional stakeholders. Levies are raised from water users, based on abstraction and pollution. Revenues disbursed through *Agences de Bassin* to farms and enterprises for environmental improvements or water management measures.

Local authorities are responsible for *water & wastewater services.* They can either provide the services directly, or delegate them to companies through management contracts, leases, or concessions. Investments are carried out and

financed by the municipality, which can draw on soft loans from central government. Water consumers are the ultimate funders of the water sector through tariffs.



Case 2: Netherlands: "A closed loop for water financing"

Central government is responsible for policy, administration and supervision of the water sector, while the provinces take care of strategic policy, management & operation, and supervision of Water Boards and municipalities. VEWIN (the water planning agency) draws up ten-year plans. The key agencies are the Water Boards, democratically controlled agencies in charge of surface water management (quantity and quality), water control, and the management of inland waterways.

The Dutch Water Bank is said to lend only to the public sector, which in the Netherlands means the risk is zero. The status of the water boards is semi-public. They have been trained to submit feasible projects and even ask for a price for a loan from private banks. The rule is that local governments, utilities and semi-public bodies should cover their cost. In the case of local governments, it means the province will check that there is no deficit in the budget.

The Dutch Water Bank is the main source of investment funds for the Boards. This publicly owned body offers banking functions for the Water Boards and that raises bond finance for them. The Water Boards raise revenues through property taxes on householders, businesses and farms in their areas. Drinking water companies are responsible for the production and distribution of drinking water, while municipalities deal with sewerage and wastewater treatment.

Distinctive features of the Dutch model:

- Public sector ownership model for Water Boards & Drinking Water companies (PLCs)

- Democratic structure of Water Boards, with strong stakeholder representation
- Strong revenue streams for WBs & water supply PLCs
- ater Bank a dedicated source of long-term loans
- Water supply & wastewater collection & treatment now self-financed (through cashflow & loans)
- Strong sub-sovereign agencies attracting long-term finance on fine terms
- High degree of self-regulation & benchmarking by WBs & PLCs

SUGGESTED READING

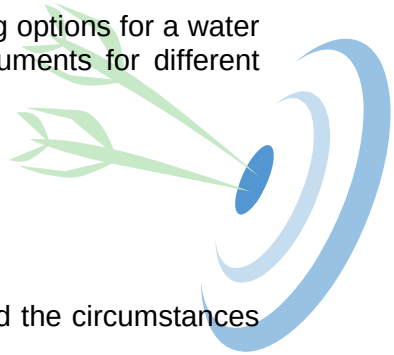
Report of the Global Panel on Financing Water Infrastructure (chaired by Michel Camdessus), 2003. Financing water for all. 2003 (available on GWP and WWC websites above).

Winpenny, J.T., 2007. Financing water infrastructure and services: an introductory guide for practitioners in developing countries. Available on Cap-Net, EUWI and GWP websites.

CHAPTER 6
APPLICATION OF FINANCIAL INSTRUMENTS

Goal

To examine in greater detail than in Chapter 5, the main financing options for a water system; and to evaluate the relevance of these financing instruments for different purposes



Learning objectives

At the end of this chapter, participants will:

- Understand the pros and cons of each financing option and the circumstances in which each is applicable;
- Be able to combine different options to provide a coherent financial "architecture"; and
- grasp the interdependence of the financing mechanisms and how synergy can be produced.

6.1. Introduction

This chapter explores in greater depth the financing options introduced in Chapter 5. The instruments are grouped into the five categories identified in Box 5.4 at the end of the previous chapter. They are presented in a logical sequence, such that the earlier ones should be considered first, and the later ones (commercial loans, equity and PSP options) should be considered only if gaps remain, and if the institutions and projects are solvent enough to justify commercial finance.

Partnerships, peer group collaboration, and private technical and managerial support are relevant across the board in conjunction with all financial options. Institutional support of these types will improve access to finance if it bolsters the solvency and commercial viability of water undertakings.

6.2. Charges for the use of water & water services

Various kinds of tariffs and charges are levied on water users. If these are intended solely to influence users' behaviour (e.g. encourage more careful use of water), there is no automatic link with the finances of the water sector and no reason why the revenues should be returned in full to water service providers. However, it is more usual for these charges to be made to cover some or all of the costs of water services, i.e. revenues are *earmarked* for Water and Sanitation and Hygiene (WASH).

The choice is then to allow the service providers to retain all, or an agreed proportion of, revenues to cover their expenses, or to return the proceeds to the central Treasury to be disbursed through the national budgetary processes. Which route is taken will depend on factors such as:

- The extent of decentralisation in service provision and budgeting;
- How much financial and operational autonomy local agencies enjoy; and
- Who takes decisions on the level of charges & tariffs.

In societies with a high degree of decentralisation for water services and adequate local autonomy and capacity, it is normally more efficient for the service providers to have control over the use of their own revenues. This also removes an element of uncertainty where national budgetary processes are arbitrary and cumbersome.

Water abstraction charges

Water abstraction charges are levies on water companies, industries, farmers, etc. who directly abstract water from surface or groundwater sources. Apart from recovering some of the public costs of water resources management, these charges are intended to encourage water conservation, and to reflect the wider costs to society and other potential users from water extraction. It is desirable that charges for the abstraction of surface water and that for groundwater bear some relation to each other; otherwise, one would be become overused, relative to the other. In some countries (e.g. the UK), the charge consists of a fee for a licence to extract water up to a pre-defined amount.

Water supply tariffs

The cost of abstracting, storing, transporting, treating and distributing water to major sectors (such as households, industries and farmers) is recovered partially, or wholly, from charging tariffs to the users.

A flat rate tariff will suffice to raise revenue, but a volumetric tariff is necessary to influence water use. A volumetric tariff requires metering (or other cruder methods of measuring usage). This may not be necessary or feasible in every situation (e.g. rural connections or the supply of low volumes to poor urban users).[6]

Where wastewater services (sewerage, wastewater treatment and/or removal of sludge[7]) are provided, their costs are normally recovered through a surcharge on the tariff for drinking water. This is partly because the volume of wastewater is highly correlated with the use of clean water, and partly because of consumer resistance to paying for wastewater services separately.

Question from the ground

How can poor people afford to pay water tariffs? Give examples and lessons learnt.

There are various ways to make tariffs affordable to poorer consumers, for example:

- Using cross-subsidies from other consumer categories;
- A basic quantity of water can be available to all (free or at a low unit rate);
- Progressive tariffs can be used (charges per unit increase with the volume consumed); and
- By avoiding any distortion in consumption, the water bills of poor households should be covered from social security payments (though this is not feasible in all countries).

[6] Conventional meters can cost upwards of $100.
[7] The residue after wastewater treatment (which is either dumped on land or at sea) – used in agriculture, or in road construction

In setting tariffs, it is common to take an "affordability" yardstick of 3–5% of average household income for water services[8]. In practice, wealthier people (with connections) normally pay less than this, and poorer people (who supplement their consumption from informal providers) pay more. However, there is growing evidence of Willingness to Pay (WTP) for access to water or improved levels of service (see Box 6.1).

Question from the ground

What is "affordable"? How can ability to pay be assessed? How is this seen in your country? Which are the different stakeholders involved, and how do they perceive "affordable"?

Box 6.1: Willingness to Pay (WTP) for water

WTP studies have become a common input into water pricing and investment decisions. They are a method of sampling the views of potential consumers about proposed projects and gathering information on the socio-economic status of users and their current water habits. They consist of surveys (postal, telephone, door-to-door or focus group) of a representative sample of the consumer group.

A WTP study should contain the following essential elements:

- *Scenario setting:* What is the project or proposition (*the deal*) that is being offered to customers?
- *Socio-economic data on the sample group* (e.g. incomes, family circumstances, present arrangements for getting water, and how much is currently spent on water)
- *WTP question(s):* The respondent is offered the "deal", with practical information on the means of payment; and is asked about Willingness to Pay for it. The key question can be open-ended (*What would you be Willing to Pay?*) or Yes/No *(Would you be willing to pay x-amount?)*

A serious and credible WTP survey is a specialised and expensive undertaking that needs time and resources. The questionnaire needs careful design by experienced practitioners and it should be pre-tested on a sample group. Enumerators should be trained personnel. The results have to be collated and interpreted by people experienced in quantitative economic and statistical methods.

Affordability is not an issue for industrial and commercial consumers. In many countries, revenues from these sectors are used to cross-subsidise domestic water use. The situation is different for farmers who receive water from public irrigation networks. They are commonly highly subsidised.

Sewerage and effluent charges

Householders, industries and other commercial users that discharge their wastewater into a public sewer normally pay a surcharge on their water bills to cover the wastewater disposal costs. Major sources of effluent, such as industries, may be subject to a special *trade effluent charge*, which is calibrated according to the strength of effluent going into public sewers and the presence of specific pollutants.

Water pollution charges and taxes

These are environmental taxes levied on wastewater effluent discharged directly into a natural watercourse. The structure and rate of the tax is normally geared to the concentration of specific pollutants, and is intended to encourage in-plant treatment prior to discharge. Ideally, the tax structure should also reward the release of adequate amounts of clean effluent, which are necessary to maintain river flows and dilute polluted wastewater (see section *f* in Chapter 4).

Licence fees and charges for specific services

Some of the costs of maintaining the volume and quality of water bodies can be

[8] (Including both fresh water and wastewater services). In countries with rudimentary sewerage, the tariff overwhelmingly reflects the cost of supply. As more sophisticated sewerage is provided, the wastewater component of the tariff will rise.

recovered directly from people and companies that depend on these services. Examples include fishing licence fees, charges for the use of locks, entry fees for ramblers and hunters, and the supply of maps & hydrological data.

Flood Risk Management (FRM) levies

There are various options for recovering FRM costs from beneficiaries (Box 6.2).

Box 6.2: Financing Flood Risk Management

Charges on water users: E.g: The French *Agences de Bassin* fund their water resources management activities [including flood control] through surcharges on customers' water bills, sometimes referred to as a "polluters' tax").

Surcharge on property owners: E.g: The Netherlands Water Boards, responsible for surface water management including flood control, recover costs through charges on property owners.

Negotiated contributions from major individual beneficiaries: E.g. large landowners, property developers, sporting complexes, factories and power stations

Charges and fees for using facilities and attractions: Certain assets created by FRM have recreational and tourist benefits which can form the basis of entry charges and fees to the general public, e.g. rambling, water sports on reservoirs, fishing & hunting rights, and canal boating.

Cost sharing from multipurpose schemes: FRM is often one of the purposes of hydropower projects, river flow management, environmental preservation of wetlands, etc. Its costs can be shared with the budgets of these other sectors.

Cost sharing in transboundary projects: FRM frequently entails transboundary projects, where costs can be shared with neighbouring countries or by tapping international funds for this purpose.

Insurance: Many governments encourage their citizens to take out private insurance policies to cover flood risk. Following a flood, insurance companies pay compensation to those affected. Taking one year with another, compensation payments are covered by premium income.

6.3. National government grants, soft loans and guarantees

Central governments channel finance (grants, soft loans and proceeds of bond issues) for *capital spending* on water to local authorities or public water companies. Where foreign aid is available, it is usually provided to central government before it is passed on to local government or public authorities. Tariff revenue from the provision of water may either be retained by the local water undertaking, or be returned to the general public coffers. Central governments may also provide *sovereign guarantees* to sub-national agencies to assist their financings.

The advantages of central government funding for capital projects are:

- Fund raising is related to national financial capacity, and can avoid local over-borrowing & debt problems;
- The national Treasury can get better terms in financial markets than local authorities.
- It can set national priorities, and can steer funds towards urgent/priority cases, ensuring equity between richer and poorer parts of the country; and
- The foreign exchange risk of foreign loans is borne by central government.

On the other hand, decisions on water funding become more politicised; central governments may give lower priority to the water sector than local governments; funding may become dependent on a fragile national fiscal situation; local service providers are discouraged from developing financial self-sufficiency; and external donors and other financiers are unable to develop close contacts with actual providers.

The central government's annual budget can also be used to support the *recurrent costs* of the water sector (see Box 6.3).

Box 6.3: Using the national budget for recurrent cost finding

The following are ways in which the central government's annual budget can also be used to support the *recurrent costs* of the water sector:

- Covering recurrent overhead costs of public water services (e.g. salaries, vehicles and offices)
- Providing the variable costs of operating water services (power, chemicals, etc.) – This is more problematic: wherever possible, such costs should be covered by user charges.
- Underwriting any financial deficits incurred by local water undertakings – If this becomes a "blank cheque", it removes any incentive on the undertaking to improve its finances.
- Providing subsidies to cover stated and specific purposes (e.g. free water for deserving cases, the cost of a sanitation programme and emergency provision for drought areas) – *Targeted* or *smart subsidies* (see section 3.2) avoid some of the disadvantages of general subsidies, particularly if they are predictable and transparent.

6.4. Financial intermediaries & development banks

Question from the ground

Do development banks add value? Should there be dedicated water banks? What experiences can you identify from your country?

Many financial agencies occupy a position between central governments and local service providers, e.g. national development banks, infrastructure development corporations, water sector banks, municipal development corporations, environmental funds, and other types of intermediaries.

These intermediaries funnel "wholesale" money down to regional and local borrowers. They are able to get wholesale finance on good terms because of government backing & sovereign guarantees, and have access to diversified sources of funding. They are closer to the grassroots than central government; can develop expertise in specific sectors and can build up experience through dealing with local clients. The intermediary can tap financial and commercial expertise. Loan repayments are available for relending to the sector, instead of being "lost" to other sectors. A successful financial intermediary can exert real financial muscle and exploit synergies from other municipal sectors. The Dutch Water Bank is one of the few examples of a dedicated water fund, publicly owned and with government guarantees.

On the other hand, many of these bodies have a poor track record and are prone to become politicised & bureaucratic. A poor loan portfolio and bad management are recipes for insolvency. Unless it creates added value, the intermediary is an unnecessary layer between government and service providers.

6.5. External grants (official development assistance)

Grants or concessional[9] loans are available from a wide variety of international agencies. As a general principle, it is sensible for developing countries to maximise their uptake of Overseas Development Aid (ODA) grant money, before contemplating

[9] A concessional loan is one that is available on better terms than those provided by private financial markets – lower interest, longer maturities, and/or grace periods before interest or repayments are due. In order to qualify as Overseas Development Aid (ODA) recognised by the OECD's Development Assistance Committee, concessional loans have to contain a "grant element" of at least 25%. In technical terms, the grant element is the discounted value of the loan's repayment stream, at the Development Assistance Committee's (DAC's) standard discount rate, expressed as a percentage of the face value of the loan.

commercial finance for this sector. However, even grants may have significant transaction costs and inconveniences; and, attracting aid from many different sources can tax the management abilities of national authorities.

Think about it

ODA grants - too good to be true? Looking a Gift Horse in the Mouth

Grants are transparent and simple. They avoid repayment obligations and debt overhang. They can be blended with other kinds of finance to produce a suitable financing package for a particular project. So far, so good; but grants may also carry political and commercial obligations (explicit or implied). Each donor has a different procedure, which could be onerous and might prolong the disbursement period. They also tend to use different technical products, which complicates procurement & spares. Donors may insist on their own institutions and special project units, independent of national systems. This makes them hard to integrate with sector programmes and creates a "re-entry" problem when aid ceases. In addition, appraisal requirements and conditionality are usually more onerous for grants than for commercial loans.

Box 6.4: Output-Based Aid (OPA)

Output-Based Aid is often advocated as an appropriate solution for the water sector.

OBA has been defined as "…a strategy for using explicit performance-based subsidies to support the delivery of basic services where policy concerns would justify public funding to complement or replace user-fees. The core of the OBA approach is the contracting out of service delivery to a third party, usually a private firm, where payment of public funds is tied to the actual delivery of these services."

In an innovative case in Kenya, OBA from the World Bank is being used to underpin a programme to extend water and sanitation to rural communities, financed by a local microfinance agency. The agency can obtain partial repayment of its loans through OBA once the project is fully implemented and revenues from user charges are starting to come in. More details are given in Chapter 7.

6.6. Philanthropic and not-for-profit agencies & partnerships

In developing countries, a high proportion of W&S programmes in rural and peri-urban areas are undertaken in partnership with NGOs, Community-Based organisations (CBO's), church groups, charities and other philanthropic and not-for-profit bodies. A number of wealthy foundations have recently started programmes in water and sanitation. Some of the most active NGOs in the water sector are UN agencies such as UNICEF, or branches of the International Red Cross. Some NGOs specialise in Water Supply and Sanitation (W&S) and have extensive programmes and experience, e.g. Eau Vive and WaterAid.

Although the largest NGOs are international, most of them also have strong local "ownership". They act as channels for decentralised donor funds (e.g: They have been major recipients of funds from the EU Water Facility). Several international networks of NGOs exist that can help to select suitable potential partners in specific countries, e.g. PsEau, the International Secretariat for Water (*le Secrétariat International pour l'Eau*) and the Women for Water Partnership.

Partnerships usually involve two or more of the following: local government, community organisations, NGOs or charities, external donors, private companies, banks and microcredit organisations. The functions of sponsorship, political advocacy and backing, professional steering, funding, implementation, etc. have to be allotted on the basis of comparative advantage. Funding normally involves combining grants for seed capital, provision of security and guarantees, with the use of commercial finance often in a revolving pool format.

Question from the ground

What contribution do NGOs make?

NGOs can attract funding that is otherwise unavailable ("additionality") and can operate in regions where official administrations are thin on the ground. They can also operate flexibly and spontaneously. On the downside, the presence of NGO workers outside the direct control or accountability of national governments could cause suspicion or resentment, and their projects may be difficult to replicate or scale up because they are privileged in various ways.

6.7. Commercial loans, bonds & private equity

1) Loans from International Financial Institutions (IFIs)

Medium/long-term loans are available from IFIs for water resources management and infrastructure. IFIs' shareholders are national governments, and they operate in many different countries**.** Some of them are obliged by their statutes to lend only to national governments, while others have the means to deal with private borrowers and can deal with sub-sovereign borrowers. Their terms are normally more favourable than those on offer from commercial sources, because they borrow with guarantees provided by their government shareholders. They can also provide impartial advice to borrowers and arrange technical assistance & capacity building, and confer prestige (the "halo effect") on a project or borrower, which makes commercial banks more ready to co-finance (e.g. through syndications).

On the other hand, compared to commercial banks, IFIs are slower and more cumbersome due to their public obligation to do more thorough appraisal and due diligence enquiries; their lending decisions may be subject to political influence from shareholder governments and NGOs; and their loans may carry more onerous conditions. Dealing with IFIs also exposes borrowing countries to risks of foreign exchange, and any default can jeopardise relations with other IFIs through cross-default clauses (a default on a loan from one institution is regarded as a default on all the others).

Question from the ground

What are the pros and cons of borrowing from IFIs? Place the question in the context of your country.

Traditionally, IFIs have dealt with central governments in negotiating their loans[10], but several of them now have the powers and instruments to deal directly with sub-sovereign and private borrowers.

[10] and equity investments

2) Commercial banks and microcredit agencies

Bank loans for infrastructure are of two main types, depending on how risks are born:

- ***Corporate finance,*** where the loan is made to a company or public corporation which undertakes the servicing of the debt (The loan may be used for spending on specific projects, but it is the overall balance sheet of the borrower that is the concern of the lender); and,
- ***Project finance***, where the loan is made to a "special purpose vehicle" undertaking the project, and the security for the loan is the expected cashflow from the project.

Project finance is also referred to as *non-recourse* lending, because the lender cannot have recourse to the balance sheet of the sponsor in the event of a default. It is typically used for identifiable stand-alone items such as water and wastewater treatment plants and major pipelines. The project may be implemented wholly through the public sector, or it may take the form of a public–private partnership. A common form of the latter is the Build, Own & Operate[11] type of contract, in which a private firm raises the finance, builds the project and recovers its costs from operating the project for a period of years, before handing it back to the public sector sponsor.

3) Microfinance

Microfinance is becoming increasingly important in financing infrastructure and facilities in smaller communities, particularly where the work is implemented by householders themselves, and involves local small-scale artisans or the informal sector. A typical loan to an individual is $10–$500, and to a community organisation upward of $1000, but well below $1-million. Microfinance is dealt with in more detail in Chapter 9.

4) Bonds

A *bond* (or *fixed interest security*) is a method of raising a capital sum by offering the purchaser (bondholder) the promise of repayment at a specified future date, in the meantime paying a fixed rate of interest. The bondholder can sell the security at any time (unlike a loan[12]) provided a market exists. Movements in the market rate of interest are reflected in changes in the price of the bond[13]. In a well-developed financial market, with sufficient buyers and sellers, a bond is a liquid asset, which can readily be cashed (though its future market price will vary). Its liquidity makes it attractive to buyers.

The terms of the bond (length of maturity – *tenor* – and any intermediate repayments) can be adjusted to match the expected cashflow of the issuer. Water investments typically have a lengthy payback period and predictable cashflow, which lend themselves to bond finance. The overhead cost of making a bond issue implies that there is a minimum economic size of bonds (probably $50–100-million). Bonds are uneconomic for small and medium-sized towns,

[11] Other variants are the Design Build Operate Transfer, Rehabilitate Operate Transfer, Transfer Operate Transfer, etc.
[12] although loans can be bundled and sold on as Collateralised Debt Obligations
[13] A rise in interest rates causes a fall in the bond price and *vice versa*.

unless they can *pool* resources with other similarly placed municipalities (see Chapter 9).

The bond issuer has to have a good credit standing, which normally limits the use of bonds to larger and financially solvent cities. The transaction is very transparent and credit rating agencies will scrutinise the financial affairs of the issuer very closely (from another point of view, this is beneficial). Any deterioration in the issuer's finances (particularly anything that causes a loss of *investment grade status*) could make future bond issues more costly – requiring the offer of a higher interest rate.

Sub-sovereign bodies that enter the bond market expose themselves to the scrutiny of *credit rating agencies*, of which the largest are Standard & Poors, Moody's and Fitch Ratings, and their local equivalents and affiliates (see Box 6.5).

Box 6.5 Credit rating – a tool for transparency & peer comparison

Credit rating agencies subject the financial status of bond issuers to rigorous and comprehensive assessment, in order to give the bond a rating, which is a key indicator used by financial markets and potential buyers. Bonds with an *investment grade* rating of BBB or higher on the Standard & Poors scale can legally be bought by local pension funds and other institutional investors with a legal responsibility to their savers. Credit rating adds greatly to the transparency of sub-sovereign finance. It permits peer comparisons and creates a market discipline on local officials and politicians.

5) Private equity

Equity is a form of finance in which suppliers ("investors") share the risks of the undertaking in return for the prospect of sharing its profits too. Equity does not necessarily have to be private – shares can also be issued by a public corporation or one with majority public ownership (a *partial flotation)*; and they can be held by public agencies as well as by private individuals and companies. Certain IFIs can take equity holdings.

Financial risks are ultimately borne by the equity holder. Dividend payments can be deferred in years with poor financial results; but taking one year with another, shareholders will expect to earn at least the market rate of return on their shares. Because this will usually be higher than the yield on bonds or bank loans, equity is an expensive form of finance for public infrastructure. Shares can be bought and sold; hence, ownership or controlling interest can change. This may be a sensitive political issue for basic public services.

Equity acts as a financial "cushion" between a corporation and its lenders: the latter draw comfort from the existence of adequate equity finance, which takes the brunt of bad results. A well-leveraged[14] concern can raise loan finance on better terms than one that is not. Equity issues make the corporation more transparent to financial markets. The regular scrutiny of credit rating agencies can act as a stimulus to good practice.

[14] Leveraging is also known as gearing: the ratio of debt finance to equity capital.

Equity has attractions as a potential source of finance in certain situations:

Question from the ground

What advantages does equity finance bring? Has it been used in your country? In what way?

- For water utilities with sound finances, good cashflow and a good credit standing (This usually means large urban utilities with financial autonomy and commercial orientation.)
- Where full privatisation is being considered, involving either divestiture of infrastructure assets or the formation of a company to operate publicly owned assets
- Where the local capital market is of a sufficient size and liquidity to ensure adequate and diversified take-up of shares (Institutional investors such as pension funds and insurance companies are key players.)

Question from the ground

How does Private Sector Participation differ from privatisation? Can you give examples of this from your country?

Some of the advantages of private equity (access to additional funds, commercial orientation and market disciplines) can be obtained without relinquishing public ownership of water assets (*divestiture* or *privatisation*), which is controversial in some societies. If preferred, infrastructure assets can remain in public ownership, and private companies can be awarded contracts for operation and management. Alternatively, private capital can be involved in joint ventures (with minority or majority holdings) with public agencies for either (or both) asset ownership or/(and) operation[15].

Apart from the direct injection of capital for the purchase of assets, private companies can facilitate financing in other ways. *Management contracts* with private operators can improve an undertaking's efficiency and finances, and should enhance its creditworthiness. System concessions typically entail the concessionaire using its own finance for essential maintenance and investment during the period of the concession. Build-Operate-Transfer (BOTs)[16], a common way of funding single asset or Greenfield items (e.g. water and wastewater treatment works, or major pipelines), entail the private partners raising finance on their own account and recovering their costs from operating revenues, before handing the asset back to the public client.

A good *independent regulator* is highly desirable to ensure that private equity works in the public interest. Regulation is equally desirable for holding *public* water providers to account for their performance. In practice, regulation is an evolving art in most countries, and expediency and adaptation in the light of experience are to be expected. A second-best alternative to a good independent regulator is regulation by contract, with appeal to an independent arbitrator or access to international law.

[15] Barriers and Conditions for the Involvement of Private Capital and Enterprise in Water Supply and Sanitation in Latin America and Africa: Seeking Economic, Social and Environmental Sustainability: http://www.prinwass.org

[16] Build-Operate-Transfer (BOT) contracts. Other similar types are the BOO (build, own, operate), BOOT (build, own, operate, transfer), DBOT (design, build, operate, transfer), ROT (rehabilitate, operate, transfer), etc.

There is a growing body of small and medium-scale local private water operators in developing countries, some of which are able to tap local sources of finance.

6) Guarantees & risk sharing

Dealing with risk involves identifying, allocating and managing risks. Insurance and guarantees are available to cover political, contractual, regulatory and credit risk from both multilateral and bilateral development agencies (see Box 6.5). One important aim of guarantee programmes of IFIs and bilateral donors is the promotion of local capital markets as safe outlets for local savings and sources of longer-term capital for local businesses, microenterprises and other purposes.

How do guarantees work?

- Mitigating specific risks (see Box 6.6) which are the critical sticking points on a project
- Enhancing securities (e.g. bonds) to take them over a critical threshold of creditworthiness
- Improving the terms on which borrowers and project sponsors can get access to loans and investment
- Giving lenders and investors exposure to previously unfamiliar markets and financial products

Box 6.6 Financial guarantees

Guarantees cover three main types of risk:

Political (war, civil disturbance, terrorism, kidnappings, nationalisation, expropriation without adequate compensation, restrictions on the conversion and transfer of foreign exchange needed for the project); Insurance cover is available from MIGA, bilateral official agencies and private insurers. This is a large, well-established and active market, with supply well matched to demand.

Regulatory & contractual (breach of contract by public offtaker[1]; adverse decisions by regulators or other public agencies due to political pressure) Cover is available from MIGA Breach of Contract policies and the World Bank's Partial Risk Guarantee. The product is case-specific, complicated to draw up, and recovery is normally difficult.

Credit (late payment or default on loans made, or goods and services provided, for commercial reasons); *Partial Credit Guarantees* are offered by IFC & other IFIs; some bilateral donors have *Partial Loan Guarantees*; and insurance policies are sold by private monoline companies (specialising in providing financial guarantees). *Devaluation risk* is a further case, but insurance against this is currently not a practical proposition, though pilot testing of possible schemes are underway.

This chapter has reviewed the various possible sources of finance for WASH. Some of these (though attractive in other ways) are only available in foreign currency. In the case of loans and equity, this poses a foreign exchange risk on the user. For this reason, among others, there is much to be said for obtaining funds from local sources, which would have the additional benefit of encouraging the development of local capital markets and outlets for local savings. This theme is taken up in the next chapter, which considers how local capital markets can be developed for providing funds to the WASH sector.

SUGGESTED READING

European Union Finance Working Group (EU-FWG). 2007. Financing Water Infrastructure and Services: An introductory guide for practitioners in developing countries

Ministry of Foreign Affairs, Sweden. 2000. Development Financing. Financing Transboundary Water Management. Policy Brief Jan/02.

CHAPTER 7
FINANCING WATER AND SANITATION THROUGH BONDS, BOTS AND REFORMS

Goals

- To look at the availability of a capital market at the national level, and the possibility to use it for water resources management
- To identify the different legal forms used for funding, which go with the different financial instruments which can be used in the water sector and have been introduced in the previous chapters
- To indicate how such a local capital market can be developed over time if the right attitude and policies are in place

Learning objectives

At the end of this chapter, participants will:

- Be aware of the importance of developing local capital markets;
- Have learnt to appreciate the importance of legal constructions to secure finance in the water sector;
- Be able to provide arguments in favour of and against private sector participation in infrastructure in the water sector; and to illustrate this in the water sector;
- Be able to show the importance and composition of foreign capital flows;
- Be able to identify financial risks and discuss possibilities to mitigate risks; and
- Understand the reforms, which need to be carried out if you want to develop a local capital market.

7.1 Introduction

We have explained that there are many sources of finance for the water sector. Still, different levels of government (just like NGOs and micro-enterprises) may find it difficult to gain access to the existing formal finance system. A lot depends on how well the capital market in your country is developed. *Can municipalities issue bonds? Are loans available for feasible water projects, and are micro-finance institutions in place to organise micro-savings and to provide micro loans? What are the legal forms used for these different financial instruments?*

We can learn a lot from experiences elsewhere with the use of capital markets, gained by Governments, NGOs and small enterprises, and often documented in case studies (for example Vincent [1995] and other references in the list of references at the end of this chapter). Below, we will give examples from India and South Africa.

In this chapter, we will start to distinguish different legal forms that exist and that can be used to obtain finance for the water sector. Subsequently, we will look at the development of the bond market to finance infrastructure in India. In the fourth

section, mechanisms for developing the local capital market will be discussed. Before drawing conclusions, some initiatives in Africa to develop a bond market for infrastructure will be reviewed. However, we will first review some arguments to partner with the private sector.

7.2 Arguments to partner with the private sector

Commercialisation of public water services in developing countries has been the trend in the 1990s. After a decade of experiments and experiences, we can draw up the balance. Divestiture, meaning the complete sell-off of utilities, is not popular and only happened in England, Wales and Chile; however, private sector participation has become very popular. The important role of small-scale private service providers in a number of African and Asian countries justifies attention to another type of private sector participation (Van Dijk, 2006).

The debate on Private Sector Participation (PSP) or Private Sector Involvement (PSI) in the water sector is highly politicised. Opponents of private sector participation in the water sector never call it PSP or PSI, but rather talk about privatisation, suggesting that this is a neo-liberal solution leading to a sell-off but with limited success. In fact, privatisation in the broad sense means PSP or PSI, but it is often used in the narrow sense of divestiture, or selling a utility or its shares to a private party. UNDP (2006) concludes that privatisation of water services has been a poor policy prescription, involving some spectacular failures. However, the study of the European market development indicates that PSP stimulated by liberalisation can also have important positive effects (Schouten and Van Dijk, 2006). Others emphasise that PSI is expensive, encourages corruption, and leads to staff layoffs, tariff increases and environmental mitigation.

Table 1: Strong and weak points of the private sector and the public sector in Public–Private Partnerships (PPPs)

The public sector is strong, because:	**The private sector is strong, because:**
• Government is expected to strive for general good. • It is used to weighing of interests. • It is good at assuring the legal aspects of the project are in order. • It will take the political responsibility. • It is good at planning and preparing the legal requirements. • It can regulate the private sector. ***Weak points*** • It cannot run major financial risks. • Frequent cost overruns on government-run projects	• It is driven by profit motive, but supposed to be more efficient. It has the technical expertise, and provides continuity in know-how. • It is willing and able to take risks. • It has a large degree of freedom in organisational structure. • It can mobilise finance and can run financial risks. • It is willing and able to organise O&M. ***Weak point*** • It may inflate costs.

Source: Van Dijk (2006)

One form of private sector participation is the Public–Private Partnership (PPP). PPPs may be defined as cooperative ventures between a public entity and a private party, aiming to realise common projects in which they share risks, costs and profit. The complementarity between the approaches of the two sectors is a reason for the success

of PPPs. Table 1 (above) shows why the public and private sector complement each other.

To evaluate the effects of a more commercial approach to water, we first need to know what the objectives of such a change were. The literature does not always agree that reforms are undertaken to increase the efficiency (which is what the economists want), or to extend the service areas (which is often what the politicians promised), or to achieve a better cost recovery (the dream of the financial managers), while it does in fact make a difference. Almost everywhere, the results of more PSI are increases in the price of water, since this is a relatively easily applied instrument to achieve better performance.

PSI has a lot to do with market and government failures. Secondly, the ineffectiveness of regulation has been noted, due to incomplete contracts and the occurrence of information asymmetries. *What policies are necessary for water?* The World Bank (1999) has suggested five basic roles for the government, providing:

1. The legal framework
2. Economic policies
3. Basic infrastructure
4. Care for the poor
5. Care for the environment

Water does not figure in the list, unless you consider it as part of the basic infrastructure. However, even making some function the responsibility of the government does not necessarily mean that the government has to carry out the task itself. It can very well subcontract it. It is interesting that the state has come back in many post-privatisation societies as a stronger state (because it is a regulating state).

The government can limit itself to creating the conditions for private sector development and controlling through regulation that the private sector will do a good job. Hence the government will have to create a regulatory framework and maybe a regulator for the drinking-water sector, which would see to it that the private sector respects the rules that have been formulated. In practice, other forms of PSI are very important in terms of the number of people employed. In particular small-scale independent providers (SSIPs) of water are good for 69% of the water supply in Cotonou (Benin), while SSIPs are sometimes involved in 90% of the sanitation facilities (in particular in the African and South Asian context).

Three types of criteria can be used for evaluating the role and potential usefulness of different actors and their projects. The prices they charge should reflect the expected efficiency, equity and environmental criteria. We will now explore these concepts applied to different examples of investments in the water sector and the fixation of different types of tariffs.

7.3 Financial instruments, legal forms bonds and BOT

Efforts made by India to finance urban infrastructure – and in particular water and sanitation through issuing bonds and using Build–Operate–Transfer (BOT) arrangements – will be reviewed, because these are the most common ways of involving the private sector in the provision of infrastructure. There are as many as forty-four initiatives in twenty-five cities in India to attract private capital or achieve some form of private sector participation in water and sewerage. Traditionally,

infrastructure finance organisations would be set up as government organisations. However, in the nineties, private or semi-public institutions have indicated in India that they are willing to finance urban infrastructure. Involving the private sector more is currently a trend in India. The reason for such unorthodox approaches to financing urban infrastructure is that the government fears that the lack of good infrastructure will constrain future growth, while (with more than six percent economic growth per year) India finally seems to be becoming an emerging economy.

Financing infrastructure depends to some extent on the legal framework and the management model. Blokland et al. (2005) distinguish seven different management models, namely the Public Water PLC, the Joint Venture, the Private Water PLC, the Corporatised Utility, The (Supra) Municipal Utility, the 'French Model' (the concession), and 'Different Types of User Management'. The main point that Blokland et al. (2005) try to make is that public ownership of a utility does not necessarily exclude 'private' management of that utility. One of the main problems, however, is that it is not clear what 'private management' incorporates. The model places municipal service providers in the realm of public management, and the Public Water PLC in the category of private management. The main criterion that Blokland et al. (2005) use is based on the legal framework under which the utility operates. The Public Water PLCs operate under private law, while municipal service providers operate under public law. The 'French Model' (the concession) gives the private contractor or concessionaire the overall responsibility for the services (including operation, maintenance and management, and capital investments for the expansion of services). The characteristics of the concession type of arrangements are summarised in Box 7.1 below.

Box 7.1 Concession-type arrangements: Lease-and-operate contracts

Lease-and-operate contracts: A lease contract (affermage) links a lessor (the private operator) who rents the facility and a public authority who owns it. The lessor becomes responsible for operating, maintaining and managing the system. The public authority remains responsible for new investments in the system. Private operators will pay a fee for leasing the assets and will bear the commercial risk. These contracts usually last between eight and fifteen years. The leasing contracts are administratively quite demanding because of the need to set and monitor performance targets. The private contractor is responsible for the provision of the service at its own risk, including operating and maintaining the infrastructure, against the payment of a lease.

The concept of project finance is defined as the development or exploitation of a right, a natural resource or any other asset, where the lenders' security and return on capital are provided solely by the project itself (e.g. the Channel between England and France). Questions that need to be asked are: *In which situation is project finance a solution?* and *What are the implications of using this legal formula for financing?* There is often a need for an autonomous organisation to undertake the infrastructural project. Autonomous refers to an agency with a Separate Legal and Financial Identity (SLFI), e.g. a country/city can decide to create a Special Purpose Vehicle (SPV). An SLFI may be instrumental in creating an SPV for infrastructural projects.

Table 2: Different legal forms and financial instruments	
Legal form	**Financial instrument**
• Special Purpose Vehicle (SPV): Build–Operate–Transfer (BOT) and its variants such as Build–Operate–Own (BOO) and Build–Operate–Lease (BOL) • PPPs • Joint ownership, for example joint ventures • Concession • Service and management contracts	• Bonds • Loans • Shares • Lease arrangement • Venture capital • Contribution in kind • Labour made available • Micro-savings and micro-finance

Source: Van Dijk (2006)

Sometimes the community itself, through some form of organisation, is a partner in the PPP arrangement. Then the term public–private community partnership (PPcP) is used e.g. for urban renovation projects or the improvement of waste collection.

Box 7.2 An example of an SPV

The Private Sector Infrastructure Development Company in Sri Lanka (PSIDC) is a public company that finances and executes projects. It works just like Karnataka Urban Infrastructure Development and Finance Corporation (KUIDFC) in the coastal project. The company allows for private sector participation. The private sector provides up to twenty percent of the share capital of the Special Purpose Vehicle (SPV) to be created. Forty percent of the total amount comes out of the market as debt and forty percent from the Private Sector Infrastructure Project PSIP as shares. Interesting aspects are:

1. The SPV formula is using project finance.
2. Capital leveraged in 60:40 formula
3. Share capital: private sector maximum of 20, and PSIP needs to put up 40
4. Long-term finance
5. Foreign and local borrowers can buy the debt.

7.4 Municipal bond markets in general

Bonds are a fixed-term debt with a fixed rate of interest and a priority treatment in case of bankruptcy. 'Municipal bonds' refer in India to market borrowing by a variety of authorities and agencies, including the municipal and state or metro-level service authorities, private or joint sector companies, financial intermediaries or special purpose vehicles to finance urban services (Economic Times of Ahmedabad, 3-5-1996).

Municipal bond markets are a growing market in developing countries. United States Agency for International Development (USAID) (1996) is helping for example Indian cities to prepare projects in such a way that bonds can be issued at the American capital market, using a partial USAID guarantee. In principle, water supply, sewerage, roads, land development, education and health facilities could be financed.

Some Indian municipal authorities had issued securities in the past, but these were general obligation bonds, backed by state guarantees for small amounts, which were privately placed with local banks or institutions (Economic Times Ahmedabad, 3-5-1996). The bonds have a tenure of ten years and they would be redeemed in three equal instalments from the end of the eighth year. The coupon rate for the first two years is fifteen percent, and eighteen percent for the rest of the period (The Economic Times Ahmedabad, 30-4-1996).

Box 7.3 Municipal bond markets

Bond lending is an important source of finance for developing countries. However, ten developed countries issued 90 percent of all bonds issued by developing countries in 1993. Asia surpassed Latin America in 1994. The current trend is that sovereign borrowers (government) are declining, while private issues are increasing. The US Treasury has recently decided to issue inflation-indexed bonds, which would provide a close to risk-free asset to an investor and an indication to the market about the expected long-term interest rate (Financial Times, 17-5-1996).

The Financial Institutions Restructuring Exercise intended to create possibilities for local governments to gain access to the local and international capital markets to allow them to finance their infrastructure. Questions asked (and answered in their publications and on their website) were: *What are the prerequisites to make PPPs a success?*, *What kind of legal framework is required?* and *Where would the funds come from?*. The emphasis was on the conditions that need to be satisfied to attract different sources of finance.

To obtain capital for infrastructure investments, all local government bodies should eventually be linked up to capital markets (Van Dijk, 1999), but a number of conditions need to be satisfied before cities can access the capital market. It requires for most local governments a substantial improvement of their municipal accounting, and necessitates other financial management system reforms. However, introducing reforms at the municipal level, improving accounting standards of all Indian local governments, and developing uniform financial reporting standards take time.

For example, Bangalore (the capital of India's Karnataka state) has been able to issue bonds to finance the necessary investments. The Bangalore Water Supply and Sewerage Board (BWSSB) completely subsidises the access charges for the urban poor and is moving towards individual facilities in the case of water supply. The consumption charges remain the same for all users in the city.

7.5 The development of the bond market in India

Let us take some more examples of the Indian experience with developing national and municipal bond markets to finance infrastructure. We will first deal with the Gujarat state and subsequently summarise some of the initiatives in other states.

Infrastructure development in the Gujarat state (one of the dynamic Indian states in the north of the country) is hindered by limited borrowing capacities of municipalities rather than by limited fund availability. Restrictive municipal laws need amendment to allow private sector participation and capital. The water and sanitation sector has been prepared in Gujarat for a different approach. The biggest city in this state, Ahmedabad, has already gained experience with obtaining a credit rating and issuing bonds, and private financial institutions are eager to get more involved in infrastructure. The State government has prepared and launched an Infrastructure 2000 Plan, which gives a vision and a strategy (Gujarat, 2000). The Gujarat state

was the first one in the country to draft a Build–Operate–Transfer (BOT) law and has experience with giving concessions to the private sector.

Under the Indo-US Financial Institutions Reform and Expansion (FIRE, 1996) Project, accessing the financial market for urban water and sanitation has caught on in the country. The Ahmedabad Municipal Corporation was the first to access the capital market through the issue of municipal bonds in 1998. Since then, twelve more municipal bond issues aggregating to Rs. 12,700 million (USD 270 million) have been issued in India to finance urban infrastructure. The Government of India provided an impetus to this process through tax exemption for municipal bonds in 1999. Models for enhanced services to the urban poor are gradually emerging in the country.

The efforts at seeking private sector participation in urban water supply and wastewater can be divided into two distinct phases (Satyanarayana, 2005). The first phase corresponds to the period from 1994 to 1999, and the second phase corresponds to 2000 to the present. Following the liberalisation by the Government of India and the decentralisation efforts, there was an unbridled enthusiasm for innovations in the urban sector in the mid-nineties. The urban water sector followed what happened in the power sector, where the focus was on attracting capital from the private sector since resources were not available within the public sector.

Only a few projects such as Tiruppur Water and Sewerage Project, Alandur Sewerage Project and operation and maintenance contracts in Chennai have been successful so far. The majority of remaining projects have failed for a combination of some of the following reasons (Satyanarayana, 2005):

- Lack of genuine commitment to reforms, as Indian reforms were initiated out of necessity rather than conviction;
- Lack of clarity in scope and framework for PSP (many of the initiatives in the sector are for BOT-type projects for source development, without adequate concern for management improvements for distribution systems and customer service);
- Lack of rigor in project and contract development, including risk management and lack of adequate concern for financial viability;
- Lack of quality support and funding for project development;
- Lack of policy support and an appropriate regulatory framework at higher levels of government;
- Lack of participation and capacity of a wide variety of stakeholders;
- Lack of continuity of champions for the projects (because leaders were transferred or defeated in elections);
- Lack of broad ownership for the project within the city; and
- Strong opposition from the existing rent-seeking elements who felt threatened

There is an amazing amount of convergence of views on what needs to be done, but with very little urgency on the action front. During the second phase, the central government and a few state governments took initiatives to develop an appropriate policy framework and incentive structure for water sector reforms in the country. It is essential to continue exploring private sector participation in management and finance of urban infrastructure. Alternative models are: service contracts with performance-based annual contracts; efficiency increases to reduce costs of private sector participation; and utility-to-utility partnerships or twinning arrangements. An

important list of issues remains to be dealt with at state and city levels. This unfinished agenda relates to reforms in governance at city and state levels. Public sector reforms at local and state levels are necessary in order to initiate and sustain widespread and sustainable reform processes in the urban sector (Satyanarayana, 2005). The unfinished agenda includes:

- Institutional restructuring to create autonomous and accountable utilities to bring in a consumer and commercial orientation;
- Shifting the focus of urban local bodies from being providers to being facilitators, and restructuring of state level water and sewerage boards;
- Enhancement of creditworthiness of cities through innovative resource mobilisation, reducing expenditure responsibilities in favour of private sector participation, efficiency improvements, etc;
- Restructuring of existing financing arrangements in favour of market-based instruments and incentive and performance-based transfers;
- Establishment of transition management funds by the state and central government to smooth the pain of the reforms by state and central governments;
- Labour reforms including setting of safety nets;
- Development/restructuring of a state and national programme for scaling-up of demand-driven approaches for enhancement of services to the urban poor;
- Setting up of independent regulatory frameworks for water supply and wastewater removal, treatment and recycling;
- Simplification or modification of municipal legislations to create a downward accountability and facilitate reforms;
- Genuine decentralisation ("letting go" of cities) and matching functional responsibility with fiscal autonomy; and
- Development of state or national level support framework for capacity building for reforms at the city level.

One of the key instruments of change relates to setting up an independent regulatory framework for water and wastewater at state level to regulate all service providers including the public sector. The primary objectives will be to improve the service quality, protect the consumers from abuse by the utilities, ensure sustainability of the service, and create an environment that is conducive for investments. Its establishment will serve as a catalyst for reforms by removing the arbitrariness in setting tariffs and service standards and promoting new sector investments. It will also help to bring in transparency, accountability and consumer orientation among the sector institutions.

7.6 Mechanisms for financing water and sanitation: The development of the local capital market

The development of domestic debt markets requires an efficient and liquid market for government debt. It also requires the development of institutions engaged in mobilising long-term savings, especially insurances and pension funds. Countries also need credit rating agencies.

Another alternative would be to go for credit enhancement through partial credit risk guarantees of the type now being offered by multilateral development banks (Sinha, 1995). Furthermore, it is necessary to continue to tap funds from international lending

agencies and to utilise these resources as seed capital for leveraging funds from the market.

The experience in India with using bonds has led to a different approach to infrastructure financing. There is a gradual emergence of a focus on institutional restructuring and defining separate roles (policymaking, regulations and operations) in order to bring in a consumer and commercial orientation by infrastructure financing.

Even Indian states are at different stages as far as the development of their local capital market is concerned and the extent to which their water sector has access to this sector. The State of Maharashtra has undertaken, for example, a very comprehensive review of the water and sanitation sector, in consultation with stakeholders; and has developed recommendations for the development of the sector. It also restructured the Capital Grants Programme covering thirty percent of the state grants to create incentives for efficiency improvements such as savings in energy and the reduction of unaccounted-for water. It also issued guidelines for private sector participation and prepared a draft note on an independent regulatory framework for water and wastewater. The Government of Karnataka is currently working on the development of an urban water policy. Even during the current phase, there are not many successful cases of attracting private sector participation at city level, with the possible exceptions of service contracts in Navi-Mumbai and management contracts in Bangalore.

7.7 Initiatives in Africa to develop a bond market for infrastructure

Question from the ground

Consider the following questions and review any local level experience from your country:

- How complex is achieving local autonomy?
- Are you willing to offer a sovereign guarantee for local fundraising?
- Where do you stand on the question of dependence on central government versus local autonomy?
- Do you have the capacity to negotiate with funders?
- How would you ensure repayment capacity for loans or equity?

A number of countries have taken initiatives to develop their local capital markets. They are eager to use bonds and equity to finance their infrastructure. Ethiopia has a bond market where the ministry of finance regularly organises auctions to sell bonds. Currently, these are bonds issued by the national level. However, the country wants to move to what is a called a sub-sovereign bond market, where also public bodies below the level of the national state can issue bonds. In particular, Ethiopian cities will be allowed to finance their infrastructure in that way. Zambia has similar plans to develop a bond market to finance infrastructure.

South Africa is one of the rare countries where this has already happened. Johannesburg has issued bonds with a guarantee of the International Finance Corporation (IFC, the commercial wing of the World Bank) and the national government (through the Development Bank of South Africa, DBSA). Although the city has not audited its accounts over the last years, it is so big and important for the South African economy that the national government and the IFC were willing to guarantee the bond. The bond was taken up (bought) by local insurance companies and investment funds.

After the debt crisis (which started in 1982), many countries were reluctant to issue bonds. Recently, some major countries (Nigeria and Ghana) tested the water again, by issuing bonds in international capital markets. It can be expected that they will subsequently make more efforts to develop the local market and introduce sub-sovereign lending.

7.8 Conclusion

In conclusion, India and its cities have initiated several positive steps during the last decade to develop a municipal bond market, which allows them to finance infrastructure in a different way. The conclusion about private sector participation in infrastructure activities (telecommunication, for example) is that the development of new technologies, combined with unbundling and more competition, has led to much lower prices for consumers. The government will still play an important role as the supervisor and will see to it that prices remain affordable (in particular for the poor) and that the quality of the services remains at a certain level.

The easiest instrument to finance your water infrastructure remains the BOT. This overview has indicated a number of factors that contribute to its success. It is necessary to have the required legislation in place; it is important to have bankable projects; and the unit that goes for the BOT should have a good cost benefit analysis. Finally, the infrastructure financed should generate a cashflow that allows the repayment of the investments made by the private party. If these preconditions are in place, BOTs can be an important instrument to finance infrastructure – just like issuing bonds assists local governments a great deal in improving their water and sanitation sector. The BOT is also politically more acceptable, because it is often an addition (something new); and it will nonetheless become government property after some twenty-five years.

In countries with weaker capital and financial markets and with a less developed policy and regulatory environment (such as many African countries), other solutions can be sought. In such cases, capacity building is important; and designating a 'lead' donor for the water sector can help. Financing micro-infrastructure advisory facilities may also help. They would focus on water supply and sanitation but opt for small-scale projects and appropriate technologies. It is noted that attention to project development is necessary, which includes the analysis of appropriate use of different financing mechanisms (grants or debt) to ensure stimulation of innovative ideas at a very small scale, rather than to smother innovation. Finally, the Official Development Aid needs to be sequenced allowing for demand-led grassroots support at community level. The longer-term objectives would then be building capacity and coming to scale.

IWRM implementation: final country level questions

Having gone through this chapter, you are now in place to consider the following questions placed within the context of your countries, where IWRM needs to be financed and implemented:

- Do you want to keep control of financing flows, or are you happy for decisions to be decentralised?
- How would you monitor the use of funds? How would you control local indebtedness?
- Are you confident of having access to new money (e.g. from aid, budget, bonds, etc.), or do you prefer to leave local authorities to get the finance?
- Does central government funding flow easily down to your level? Are there blockages?

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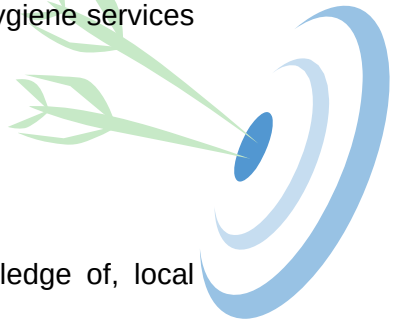
CHAPTER 8
LOCAL FINANCING MECHANISMS FOR WASH SERVICES DELIVERY

Goal

To deepen the participants' understanding of the issues connected with local finance mechanisms in the context of locally provided water, sanitation and hygiene services through:



Learning Objectives

At the end of this session, participants will:

- be able to reflect upon their own experience with, and knowledge of, local finance mechanisms;
- be familiar with various finance options and their respective pros and cons;
- be able to consider the conditions that best provide enabling environment for local finance arrangements; and
- be able to identify main constraints and opportunities for establishing effective local finance mechanisms.

8.1 Introduction

Local governments, development agencies and communities in different parts of the world are struggling with the issue of decentralisation and cost recovery for public services such as power supply, education, water and sanitation. In terms of water, sanitation and hygiene services (commonly referred to as WASH services), few countries have realistic policies, operational strategies or plans for cost recovery and sustainable financing for increased service coverage, particularly for the poor.

Finance should be considered a means to an end, with the end being safe, adequate, accessible, affordable and sustainable water and sanitation for all, irrespective of who is responsible for managing and providing the services (i.e. community, utility or municipality).

This chapter is designed to deepen understanding of issues connected with local financing mechanisms. Summaries of practical experience in implementing cost recovery policies, and in innovative finance mechanisms (such as pooled resources and microfinance) for WASH services, are included where available.

8.2 Actors and financing mechanisms for improved local WASH Services

A wide range of finance mechanisms is available for sustainable service delivery for the poor in developing countries. In practice, different mechanisms are often used together to meet the needs of a particular situation. Box 8.1 below details their common elements.

Box 8.1 Elements of Local Financing Mechanisms

Establishing equitable, financially viable and sustainable WASH services requires a series of financial and administrative steps as part of the process of assessing, planning, implementing, monitoring and adjusting the means of services delivery. These steps include:

- Setting cost recovery targets
- Analysing ability and willingness to pay
- Calculating affordability
- Setting service objectives
- Calculating the basis for charging
- Tariff setting
- Billing and collection
- Bookkeeping
- Financial control and monitoring

Importantly, most innovative mechanisms focus on understanding and stimulating demand for finance to access WASH services. A further critical focus has emerged in the form of building capacity for 'new' mechanisms and approaches to take root and, ideally, achieve scale.

Approaches to national, regional and specific location cost recovery and finance mechanisms vary widely, according to who funds and provides services. Donors and NGOs generally make local and project-specific investment decisions, and it is important to note that these can lead to policy disparity between projects and public sector provision or governance.

Lower-income countries have traditionally supported public WASH providers through grants and low-cost loans, not requiring full cost recovery. The result has often been poor-quality services, accessed mainly by higher-income groups, and with weaknesses in systems operations and maintenance (O&M). Providers' focus has been on meeting government needs, rather than on customers and their interests. Even in community-managed systems, lack of sufficient revenue impacts on long-term capital maintenance; so the next generation of users must fund a greater proportion of maintenance and rehabilitation costs.

Box 8.2 Goals of local finance mechanisms in the WASH services sector:

- To ensure sufficient revenue to deliver services over the long term
- To ensure sufficient revenue to support improved quality of services
- To ensure sufficient revenue to extend service coverage, particularly to low-income consumers
- To ensure better use of scarce water resources and management of wastewater disposal to conserve the natural environment

Finance options for local WASH services: Pooled resources and revolving funds

Question from the ground

Could you give examples from your own country of policies that address cost recovery and financing of WASH services delivery? Please list those policy objectives you are familiar with (i.e. What is the stated purpose of cost recovery in your country's policy?)

A revolving fund is a pool of capital created and reserved for specific activities. As a demand-led approach, revolving funds are created and used in WASH services delivery for covering costs such as water and sanitation infrastructure development, O&M, system extension or rehabilitation. A revolving fund's general basic condition is that the money borrowed be returned to the fund for reuse in similar activities by other fund contributors. The arrangements for one such programme in Ghana are discussed in detail in Box 8.3 below.

Box 8.3 Use of revolving funds for water infrastructure in Ghana

The Ghana Association of Water and Sanitation Development Boards (AWSDB) was established in 1995, after a CIDA[1]-funded rehabilitation project that involved fourteen communities. A minimum deposit was required for O&M, except from the poorest communities, representing 5% of project capital costs. The communities formed a private association to open a deposit bank account which then transferred saved funds to the WASH sector agency. Accumulation of funds has since grown, and twenty-two more communities have joined.

A key strategy for mobilisation of deposits was to establish a reserve fund put into short-term, high-return investments. The interest represents a large capital base for member boards in each district for WASH activities. Credit provision began in 2001 with monies given to twenty water boards for major replacement works. No interest was charged on loans until 2004. Loans granted to member boards have varied from ¢2m ($220) to ¢50m ($6,000), with an average of ¢14m ($1,555).

The AWSDB has now begun to ensure profitability by charging commercial rates. However, a low rate of loan recovery (32%) and continuous withdrawal are depleting reserves available for investment and for operational expenses. Low investment means low returns, reducing its ability to support member boards.

Interestingly, a recent visit to the AWSDB revealed that cost recovery rates have dropped to a mere 5%, with member boards citing a lack of income due to frequent breakdowns in water services, and the need for further repair and rehabilitation before recovering costs from users. This suggests that organisational inefficiencies of water service providers are not being addressed, perhaps in part due to the availability of low-cost finance elsewhere. Member boards are now unable to generate sufficient revenues to contribute to the fund itself, which, combined with the policy of investing (mostly) in T-bills, has resulted in a declining capital base.

The main constraints to the success of the AWSDB are the:

- the low level of loan recovery;
- the lack of autonomy of boards;
- the lack of planning and management skills;
- the macroeconomic instability; and
- the rising poverty levels.

Sources: Acheampong (2007)

Finance options for local WASH: Microfinance

Microfinance has existed around the world for centuries, but 2005 (the UN Year of Microcredit) was instrumental in advocating for microfinance. Both microcredit and microfinance are being developed as strategies for infrastructure development, poverty alleviation and income generation.

Box 8.4 Microcredit and microfinance

Microcredit is the principle of giving small loans to the very poor to help them generate an income of their own (Wheat, 1997).

Microfinance (broader than microcredit): It incorporates savings and insurances as well as credit. It means literally a small amount of finance is provided and entails provision of diverse financial services to low-income people. However, there is not one agreed definition of the term, and it can mean anything from community-based revolving funds to the products offered by affluent banks to specific clients (not necessarily the poorest).

The term itself is becoming obsolete and "building inclusive financial systems for the poor" is increasingly used as institutions that provide financial services to the poor become more diversified and cannot be described solely as Microfinance Institutions (MFIs).

As the topic of financing WASH services has moved up the policy agenda recently, microfinance has received more attention in recent years, as it can make an important contribution to achieving the Millennium Development Goals (MDGs). Used properly, it can help to reduce income poverty, lessen vulnerability of the poorest, empower women and help the poor to access services. Some argue that the core obstacle to increased microfinance in the WASH sector is lack of awareness of the business case for projects (CREPA/IRC, 2006).

There are several examples following the Grameen Bank strategy of providing group loans for traditional micro-finance activities in the water sector. These tend to succeed in rural areas; however, many argue that solidarity loans only work in rural settings or other situations where people and communities are close with strong social networks. As businesses grow for some group members, individual financing needs change. Once loans are repaid and an individual builds a credit history, there may be no further need for collective guarantees.

Box 8.5 Microfinance as a means to scale up household connections in Côte d'Ivoire

Microfinance can be essential in providing access to WASH services for peri-urban households, as is the case in Cote d'Ivoire where 300 households benefited from microcredit provided by an NGO to pay required connection costs to SODECI[1] (Côte d'Ivoire water distribution company). In three neighbourhoods of Abidjan, CREPA Côte d'Ivoire[1] (an NGO) partnered with SODECI (the public water utility) to enable poor households to make network connections.

With grant funding from UNDP, CREPA first pre-financed the full amount (US$36 each) of connection fees as a loan for all 300 households. At the same time, CREPA provided a capacity-building programme aimed at mobilising household savings for loan repayment and ongoing water bills.

The micro-loans were paid back in seventeen months. This example is now being replicated in Ouagadougou where credit is managed by a Microfinance Institution (an MFI).
(Kouassi-Komlan, E. and T. Gnagne, 2005)

Microfinance and sanitation

Sanitation interventions have had relatively low impact considering the scale of the problem, i.e. 2.4 billion people without access to adequate sanitation. Few programmes have reached more than 100,000 people. And even when latrines have been constructed, many are not used, or are not used as latrines.

Question from the ground

Are there examples of microfinance for local WASH services in your country? If not, could you give examples of microfinance schemes, and mention how they are structured and connected to initiatives in other sectors?

Low coverage can be explained partly because sanitation improvements, and hygiene education components that go with it, start off as highly subsidised pilot projects and are unable to make the transition from pilot to mainstream programmes due to the lack of proper financing plans.

Despite this, cases are increasingly appearing where microfinance has been used for construction of household latrines, public toilet construction, manual latrine-cleaning services and suction trucks for emptying pits. Potential microfinance clients for sanitation or sanitation-related services include Small-scale Independent Providers (SSIPs) and households.

Leveraging household and community resources for sanitation improvements has been reported in countries such as India, Lesotho, Vietnam, Pakistan and Burkina Faso (Mehta and Knapp, 2004). Revolving funds for sanitation schemes at village level do not require collateral. Money is saved and borrowed on a rotation basis with no interest to cover the cost of a basic septic tank, for instance. Households often contribute labour.

Some general rules gained from microfinance for enterprises apply equally to microfinance for sanitation provision. A credit scheme should be based upon market research of locally based demand, appropriate financial and accounting systems, thorough understanding of the borrower and intermediary capabilities. Interest rates need to be based on the cost of fund administration and labour costs, loan loss allowances, inflation margin and capital returns. Cost recovery is central to financing mechanisms; as in this way, a sustainable financial system is achieved. Instead of directly subsidising household sanitation, aid can be used to cover some of these costs. Loan administration and collection systems need to be simple and adapted to specific needs of clients.

Community-Based Organisations (CBOs)

Because of cost recovery strategies and the need for community ownership of water systems, an increasing number of poor communities need to pay upfront, in cash, 10–20% of capital investments in water infrastructure. Usually, they must save for some years before they are able to pay the required costs. Once a system is in place, funds are rarely available for rehabilitation or major repairs.

To overcome the latter, ASCI in Ethiopia and K-Rep in Kenya provide financial services to Community-based Organisations (CBOs) for water in rural areas. The CBOs have a separate account for community investments and make regular savings deposits, which enable them to access funds for larger repairs and maintenance.

Independent providers

Small-scale providers tend to lack access to credit for buying water storage facilities, or to buy and repair water tankers for transport. Borehole operators need finance to drill boreholes or build small water networks. Without access, most operators rely on family or informal loans, limiting growth potential.

PAPME, an MFI in Benin, provides credit to clients who borrow money for buying pipes, taps and hoses. Likewise, CMFL (a Ugandan MFI) offers loans for construction of wells, both for households and urban entrepreneurs who resell water. CMFL considers entrepreneurial activities of independent water providers as a business venture.

Municipalities and small utilities

Many municipalities are not allowed to access credit because of the legal framework or because they cannot obtain a credit rating (an independent assessment of the creditworthiness of a borrower), either because they are bankrupt or do not have resources to pay for the rating. This is a major constraint to their ability to provide water supply services.

As a result, interest from International Finance Institutions (IFIs) and bi-laterals to support sub-sovereign lending and guarantees for the water sector is increasing. These need to be adapted to local realities of countries with weak or non-existent financial markets.

One example is the cost-sharing mechanism established by Butwal municipality in Nepal, which adopted a cost-sharing approach for water supply, whereby 80% of capital costs are paid by users and 20% provided as a municipal grant. Users pay their 80% on an instalment basis (US$1 per month per household), over an agreed period. Payments are deposited into a municipality-managed Drinking Water Management Fund[17].

A number of risks that constrain sun-sovereign lending include:

- relatively weak accounting and financial skills within some utilities;
- foreign exchange risks where tariffs are collected in local currency, yet the loan is in foreign currency (most IFIs and donors are unable to provide funding in local currency);
- capital requirements, even for smaller utilities, are more intensive than for independent or community service provision;
- high reliance on user fees for recovering costs; and
- political interference in price setting, as water tariffs are such a sensitive issue.

Households

Another source of local liquidity is households. Experience with slum-dweller federations has shown that households and communities can mobilise finance through savings pools and self-investment for WASH investments, often as part of broader upgrading initiatives. Another way to tap household funds is through cross-

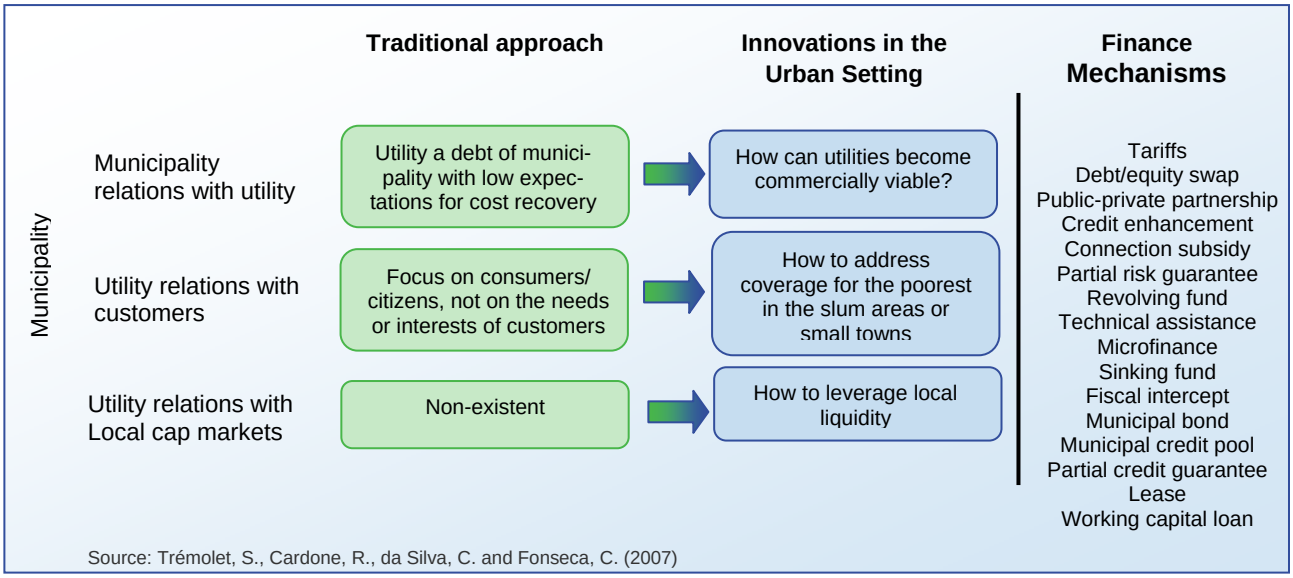
[17] More information about this practice in Nepal may be found through WaterAid.

subsidy or utility bill surcharges, deposited in a fund for connections or pro-poor investments.

8.3 Mechanisms at the municipal (and utility) level

Municipalities and utilities, as main service providers in urban areas, face considerable pressures from urbanisation and population growth to extend services. Even well-managed utilities cannot maintain the pace of service extensions (partly because the majority of new urban residents are poor, are often from rural areas where cost recovery expectations are limited; and urban expansion is often in areas without secure land tenure).

Figure 8.1: Features of innovation in financing mechanisms at the municipal level



Source: Trémolet, S., Cardone, R., da Silva, C. and Fonseca, C. (2007)

The mechanisms outlined in Figure 8.1 above are premised on cost recovery, from user fees alone (unlikely in most lower- and middle-income country contexts) or a combination of user fees and fiscal transfers from government.

8.4 WASH utilities operation: aiming for efficient management

A growing consensus has emerged that while WASH utilities should be publicly owned and controlled, they should operate on business principles, including revenue management, efficient customer service, competent operations, and corporate governance. The logic of an effective cost-recovering utility is that ultimately, a utility's ability to finance itself – from its balance sheet, by borrowing at commercial rates or launching a bond to benefit from lower interest rates – will free up government and ODA flows to focus on pro-poor activities.

Both internal and external factors can affect utility transformation. A series of factors that feature in better-performing, bankable utilities are outlined in Figure 2 below.

Table 1: Internal and external factors to support utility transformation

External factors	Internal factors
• Government support • Autonomy • Understanding of external risks • Understanding of economic base	• Financial and credit management • Management quality/capacity • Operational performance • Strategic planning and internal transformation • Human resources and utilisation of private sector • Customer relations

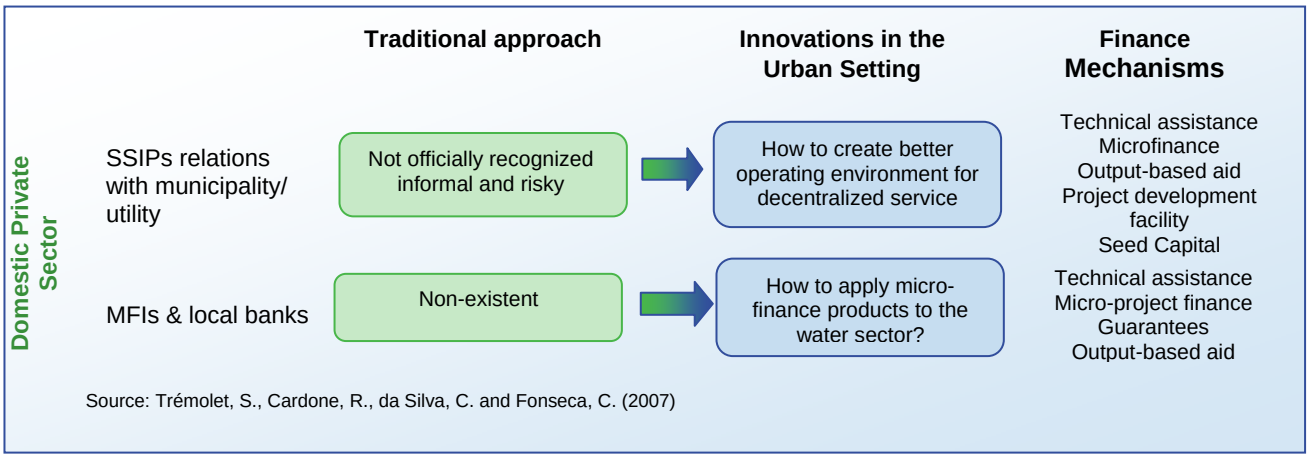
8.5 How to extend coverage in slum areas and small towns

Traditional approaches to improve Water Supply and Sanitation (WSS) often start with a utility's existing operations, rather than addressing issues specific to slum areas and rapidly growing small towns. By contrast, innovative approaches tend to start with discussions on how to finance services in poor urban, peri-urban, and small-town areas, whether through a utility or alternative means, such as small-scale providers.

1) Mechanisms used by the domestic private sector

Traditional WASH financing models have tended not to recognise the domestic private sector, which includes Small-scale Independent Providers (SSIPs), MFIs and commercial banks. Urban SSIPs tend to operate informally and outside the scope of the formal utility and government. Likewise, microfinance and commercial banking in the sector was non-existent, as (formal) WASH sector funding was provided by the public sector. Innovation calls for harnessing entrepreneurship and scope of coverage of SSIPs, as well as tapping into MFIs and commercial banks' finance sources. Figure 3 presents some key questions that innovative finance seeks to address, along with some evolving finance mechanisms.

Figure 3: Innovation features in financing mechanisms by domestic private sector



Source: Trémolet, S., Cardone, R., da Silva, C. and Fonseca, C. (2007)

2) How to create a better operating environment for decentralised service provision via SSIPs

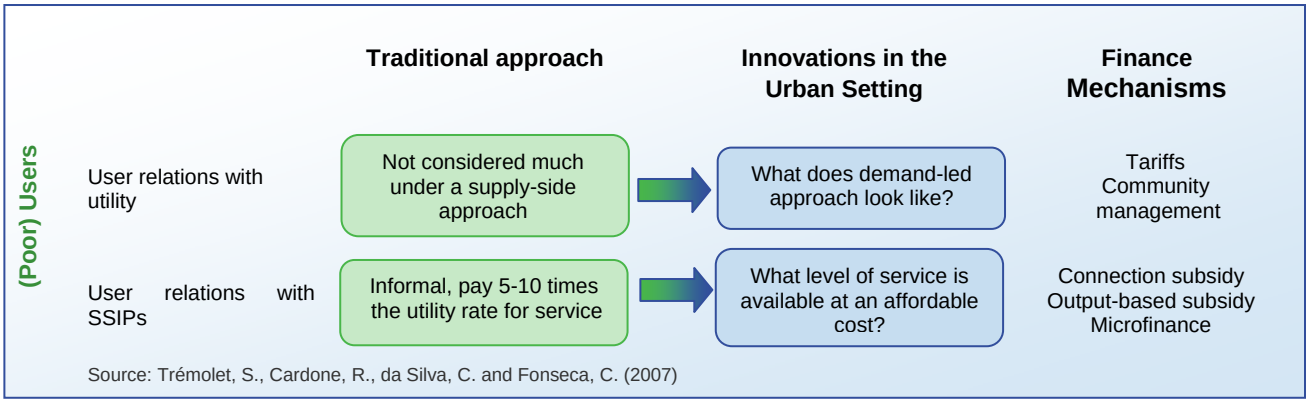
SSIPs can be informal or formal, working as service providers or as drillers and construction workers (e.g. masons, artisans). Though informal providers operate under greater regulatory uncertainty than formal SSIPs, both are constrained by limited credit access. Meanwhile, utilities often have a mandate to provide services in areas where SSIPs operate, yet are unable to meet this mandate, due to the lack of financial and/or technical capacity.

One way to improve the operating environment for decentralised services is to develop collaboration opportunities for utilities and SSIPs. Examples of such partnerships include the use of design–lease–build contracts.

3) Mechanisms adopted by poor users

Poor users remain the ones who pay most for water and sanitation services, both in cash outlays (e.g. daily water purchase) and in terms of health, education, social and economic losses, due to the lack of safe and clean services. In traditional systems of water sector finance, users are not typically considered, as discussions about financing focus on Development Finance Institution (DFI) funding, or on international NGOs and External Support Agencies (ESAs). Recent innovations shift the focus to a demand-led approach, with government and international partners providing a supporting, rather than a leading, role. Figure 4 examines this relation and options it presents.

Figure 4: Features of innovation in financing mechanisms by (poor) users



8.6 What level of service is available at an affordable cost?

A range of finance is provided by users, including user fees (tariffs), community-led schemes, connection subsidies, output-based aid and microfinance. Service levels provided by these means vary depending on initial water quality, location of sanitation relative to water supply points and type of technology adopted. Experience suggests that unit costs of service provision and unit costs charged to consumers are reduced by demand-led approaches.

Developing effective supply chains for sanitation products and promoting demand has proven more effective than household subsidies. Microfinance can be used to start up activities required to provide WASH services, even those managed by communities themselves.

Table 2 articulates a number of discussion questions around financial arrangements for community-managed systems, useful during planning processes.

Table 2: Elements of Financing Mechanisms in Community-Managed Systems

Key issues to discuss	Keep in mind
Which costs must be covered?	Payment, cash or kind, of caretaker responsible for O&M Purchase of tools and spare parts Running costs for the WASH committee System expansion Loan repayment
Which funds should be used?	Community/user contributions Interest from community savings Externally provided funds (from donors, national government, etc.)
Which tariffs should be used?	Flat tariffs, i.e. the same for all households, irrespective of the amount of water used Flat tariff per consumer, i.e. payment depends on the number of persons in the household and not on the actual amount of water used. Tariff per unit of water drawn Low tariff for poor households; higher tariff for better-off households Low tariff for the first few units per person; a higher tariff for subsequent units per person
How to collect contributions	User contributions to establish a separate WASH fund deposited bank User fees through metered connections, payments at the water point or weekly/monthly payment to the treasurer Submitting proposals for external funding
When is an appropriate time to collect contributions?	Monthly At the beginning of the fiscal year As and when required After a crop or other productive activity
What to do with 'bad' payers	Analyse causes for bad payment or non-payment and act upon these. Organise a campaign to promote prompt payment. Improve services. Impose sanctions.
Where should money be deposited?	Community account Dedicated account in a bank In objects that can serve as investment
What should be taken into consideration to administer the funds?	Receipts for accounting Financial control Authorisation to draw money from the bank account Comments and recommendations of the users
Who should administer the funds?	Community committee Community accountant External accountant
How to pay staff who are responsible for O&M	In cash or kind After a task has been fulfilled On a monthly basis Every year, after a crop or other productive activity

Adapted from: Bolt and Fonseca (2001)

8.7 Key Elements: An enabling environment for increased local finance flows

A few factors seem to encourage the emergence of local financing mechanisms for maintenance and expansion of drinking water and sanitation services to the poorest.

At ***policy level***, political support and a legal framework are required for increase private sector investments and for microfinance institutions to develop. The perceived transparency of financing processes and the people managing the funds are key to its sustainability.

At the ***intermediate level***, decentralisation is perceived as the most crucial element of an enabling environment, because it allows identification of priorities at local level (district–sub-district–municipality–village) within the planning process. Decentralisation of fiscal revenues and allowing decentralised government to raise or keep local taxes, accompanied by capacity building, are important factors to leverage local finance with other financing mechanisms.

At ***community level***, awareness raising in savings and management of funds is relatively simple and highly effective. Recognition of social capital makes local financing mechanisms sustainable through mutual trust and social pressure. INGOs, NGOs and local champions often form a bridge between microfinance organisations, water utilities and the poorest clients.

8.8 Main constraints

- **Need for longer timeframes and a combination of supply-side and demand-side approaches**

  In considering 'innovative' finance mechanisms, understanding the approach and context at local level is essential. Effectiveness is contingent upon an appropriate balance between demand-led approaches for (cheaper) operational design and financial management, and supply-side approaches to provide strategic capacity building and facilitating support to enable scaling up.

  Programmatic and demand-led approaches take time to develop and, where appropriate, are participatory. These approaches need clear links with actual finance, whether a budget or a source of finance. Accountability and transparency are critical in all innovative mechanisms.

  Traditional finance mechanisms and their accompanying supply-side thinking are often entrenched in incentives and structures of development finance institutions, national governments and other ESAs, as well as in the mindset of the poor, who are traditionally viewed as aid beneficiaries rather than empowered change agents. The success of innovative mechanisms requires longer timeframes, with learning and coordination components, patience, and consistent local presence within poor communities.

- **New risks require holistic interventions**

  Shifting from traditional to innovative finance involves different and new forms of risk, particularly for mechanisms reliant on cost recovery. Social mobilisation is required to encourage cost recovery, and for users and utilities to make the link between better service delivery and cost recovery. Combinations of different innovative finance mechanisms and approaches are needed to address different risks.

  Water and sanitation must be seen within a broader context of shelter and livelihoods for poverty reduction. Costs associated with financing access to WASH services must consider: reduction in healthcare costs, housing and education improvements, and increased economic activity.

- **Innovative financing mechanisms are still anecdotal and context specific**

  Greater dissemination of experience and information about successes, failures and lessons learned is needed, particularly regarding the use of innovative approaches.

  All regions considered herein have experience with innovative finance mechanisms; however, success is very context specific. Though a utility in South Africa is able to launch a bond, it does not necessarily mean that all utilities in South Africa would be able to do so, or that launching a bond is a desirable financing approach to reach the poorest in all regions.

  Differentiation between low-income and middle-income countries may also be of less importance when discussing the needs of the poor. What seems to matter is how well the sector is able to work within, and influence, the country's enabling environment.

- **Innovation is not the same as pro-poor**

  Many innovative finance mechanisms are interesting for the ways in which they address risks posed by the WASH sector, yet direct impact on the poor is not always apparent. For example, use of guarantees is supported by many agencies; yet this mechanism itself poses considerable challenges (including currency issues, since most donor agencies are unable to provide funding in local currency).

  Many argue that making profits from the poorest is ethically wrong, even if MFI interest rates are lower than those of informal moneylenders. However, for many donors, foundations and private investors, the notion of fairness is appealing: the poor deserve to have access to financial services as much as those who have money.

- **The long route from approval to disbursement, to impact**

  The success of programmatic support varies and depends on the implementation capacity of a country's government: municipalities need to be well organised; funding needs to be channelled to the local level as directly as

possible; and public funding needs to be available to other key actors to support the process (e.g. NGOs).

There is a danger of too much focus on investment rather than on the sustainability of investments leading to lasting access for the poor. Also, the poor remain an unattractive market for tendering. Delays in implementation can be enormous, and the public disbursement mechanism may need revising. Monitoring systems are notoriously weak and setting indicators is insufficient to ensure follow-up.

- **Integration of facilitation skills and support needed throughout pilot programmes to avoid creating islands of success**

Success has been seen in cases where ESAs provided transaction support, by working in a facilitating manner to build technical and financial skills of implementers (whether individuals, communities, or private operators). In some cases (such as WSP-AF in Kenya), this transaction support is institutionalised through the pilot project, which aims to build a new, local market sector for business development specialists who can provide technical and financial audits, as well as support projects through implementation and post-implementation. This provides a route to scaling up, and prevents a project from becoming an island of success.

- **Making finance more accessible**

There are many facilities and funds to be accessed in the WASH sector. However, only a few (mainly international) organisations are able to capture those funds. Project preparation process and costs should be simplified, and standard operating procedures for assessing viability of projects are needed. These should be developed with community members to ensure they are understood, so that facilities and funds can be accessed by a much wider range of stakeholders, particularly locally based institutions and groups.

- **Sometimes, additional finance is not the solution.**

Scaling up finance is often understood to mean mobilising additional resources to finance WASH services. An alternative, more correct, understanding is the scaling-up of safe WASH services with (innovative) finance serving as catalyst for this change. While demand-led approaches are seen to work more effectively than supply-driven approaches, the successful retain key elements that grounded their success: proximity to customers, elements of cost recovery, community-led decision making, and, effective management.

A utility's ability to provide efficient and effective WASH services depends strongly on its internal operating environment and culture, as well as the external enabling environment, including the environment of the WASH and financial services sectors.

- **Limited outreach**

In 2000, there were an estimated 30 million families worldwide with access to microfinance, of which 19 million were identified as very poor. Nine percent

(9%) of the poorest families had access to microcredit in Asia; and in Sub-Saharan Africa, this number was around 6% (Daley-Harris, 2002).

- **Limited product diversification**

Limited outreach is also linked to weak product development for poorest clients. Most loans are designed for income-generating activities; yet, when loans are extended to other areas such as housing, initial loan conditions remain unchanged, i.e. loan cycles are not adapted.

- **Financial sustainability of microfinance institutions**

The costs of providing microfinance are not low. Small loan size and the increased need for follow-up during loan cycles carry high overhead costs, which are included in loans, raising interest rates. Also, many MFIs claim they are sustainable and that loan losses are lower than default rates among customers of big banks. However, many lack transparent monitoring systems and are highly donor-subsidised. A survey of 1,000 MFIs in sub-Saharan Africa, found that twenty were estimated to be financially sustainable; and it took some of them five years of surviving only on donor support (like soft-loans and grants) before breaking even.

Another constraint relates to countries' regulatory frameworks. These often do not accommodate more-flexible financial frameworks that help poor people to access financial services. Even if MFIs are efficient, good banking cannot do much with bad government that limits the growth of MFIs by preventing private investors to explore the market.

- **The role of the intermediate level in scaling up community innovations**

Champions of innovation in finance mechanisms are often communities themselves, bolstered by strong leaders who are willing and able to take risks. However, it can be difficult to scale up success of a local, demand-led approach without buy-in from regional government and support from ESAs. ESAs with a strong local presence and implementation focus have proven beneficial in building capacity and providing 'soft' skills needed to scale up context-specific initiatives.

8.9 Opportunities

- ***Opportunities for leveraging resources***

Instead of subsidising household latrines, a real opportunity exists to using aid better by developing revolving latrine funds in rural areas or peri-urban house sewerage connections.

Microfinance and commercial project development can be linked with subsidised activities (mainly by NGOs) such as sanitation promotion and other technical support for cost-effective solutions and quality control (e.g. prevention and mitigation of water source contamination).

- **Strategic partnerships to develop scalable solutions**

  Given the need to build new markets and expand a client base, some MFIs have sought strategic alliances with NGOs and other financial intermediaries that offer the possibility of complementary skills to reach these markets, with lower running costs for MFIs since these are supported by financial intermediaries. There are a number of examples where donors set up guarantee funds as an incentive for MFIs to provide loans specifically for sanitation activities.

- **From charity to business**

  An increasing number of new MFIs are not the result of charities or NGOs created to serve the poor. Existing institutions such as private commercial banks, finance companies, insurance companies, and many NGOs that have also become regulated MFIs are seeking new clients among the low-income segments previously seen as “unbankable” and not creditworthy.

- **Increased competition**

  Though some MFIs complain that their best clients are now moving to formal banks that also provide microfinance, the increasing number of institutions that provide microfinance are stimulating competition and leading to innovation, increasing the number of clients reached.

- **Attracting private finance**

  Most formal banks in developed countries rely on rating agencies to attract investors. Rating agencies provide an “objective” credit benchmark that enables others to check and compare the performance, value, risk, etc. of a lending organisation.

  Specialist rating agencies have recently emerged to meet the need for rating MFIs, and quite a number of microfinance institutions have been rated (www.mixmarket.org). The MFI pays for the rating and passes costs on to borrowers. This trend reflects recognition from private investors that microfinance can be profitable.

- **Diversification**

  Microfinance provides an opportunity for more coordination of development services, given its potential in combining health, nutrition, housing improvement and education. In areas where group loans are maximised, a growing trend is to move away from group loans to individual loans to allow for more and faster borrowing. A client’s creditworthiness is built up over time, with lenders loaning larger amounts over longer periods.

  Expanding lending to include savings schemes and micro-insurances also allows smaller MFIs to take deposits, build capital, lower costs, and to increase the potential to access even more finance from larger institutions interested in microfinance.

- **Development of sanitation supply chains**

  Microfinance for sanitation and sanitation-related services can improve access to safe disposal of excreta for improved hygiene and environmental sanitation conditions. Developing effective supply chains for sanitation products and promoting demand has proven more effective than household subsidies. Microfinance can be used for starting up activities required to provide sanitation services, e.g. providing building materials and emptying pits.

  The small-scale private sector can tap markets for sanitation or hygiene-related products. However, start-up activities require credit. Service providers are able to make a decent profit; and as such, there is an incentive to create demand and ensure supply. Appropriate and affordable technology is essential. Technical support and help with contracts are attractive and appreciated characteristics of any sanitation scheme. Providing a variety of different sanitation options to meet specific individual needs is advisable.

8.10 Conclusion

In this section, we have seen that innovation is not about what a finance mechanism looks like, but rather who is using it and how. We examined cases from different regions, by looking at financing options used in a given context, actors involved, and details on how each option was arranged.

Innovative local finance mechanisms cannot transform a poorly planned or managed project into a good one. However, they can help to address some different constraints to accessing finance faced by households, CBOs, SSIPs and municipalities.

Although microfinance, for instance, may be one means to increase sector finance, non-financial measures are often more critical than merely increasing finance. For example, the requirement of most utilities for connection costs to be paid in one lump sum remains a key barrier for increasing coverage for the poorest.

Financial allocations must be linked with empowerment and people's involvement. A few cases demonstrate that linking water and sanitation projects with productive activities and social marketing decreases the risk of non-reimbursement of loans.

Linking microfinance with aid to leverage local resources has the potential to increase aid outreach. Donors can provide guarantees to enable small banks or cooperatives to provide microfinance to the water sector, which otherwise would be considered too risky.

Finally, financial intermediaries can pool together existing saving schemes from CBOs to aggregate small projects for possible economies of scale and to access more interesting microfinance products which can then be used for different needs of communities.

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PART 2

Facilitators' Guide

SAMPLE COURSE PROGRAMME

Time	Subject	Content/Purpose
Day 1: Principles and Concepts		
Morning 1	**Welcome, Opening and Introductions**	Welcome and course introduction. Revision of the course programme, objectives, facilitators, training materials, methods, etc. Review of logistical matters. Participants' introductions Sharing of expectations Questions Approach: Friendly and warm first session. Be participatory from the beginning.
Coffee Break		
Morning 2	**Basic principles of IWRM**	IWRM principles Refresher on IWRM, questions answered. Content: Chapter 1 Approach: Presentation questions and answers This is a good session to assess the group knowledge on IWRM basics. An open session for a group discussion may follow. Suggestion to be discussed: "Putting financing and economic instruments into IWRM perspective"
Lunch		
Afternoon 1	**Implementing IWRM: Why are economic and financial instruments needed?**	This session is to create a vision of many other contents that will be seen in depth during the week. The facilitator should keep this in mind and present a broad picture. Questions may be raised and some could be answered later in the week. Content: Chapters 4 and 5 may be considered for this session. Approach: Two different sessions may be delivered: i) The nature of water as an economic and environmental good; ii) Implementing IWRM: Why are economic and financial instruments needed?
Tea Break		
Afternoon 2	**Water management institutions**	The "Enabling environment and institutions" are key for IWRM implementation. This session is to link economic and financial instruments with a broader context and to reflect that these instruments are not an isolated tool that will bring on-their-own solutions. Content: Chapters 1, 2, and 4 may be considered for this session. Approach: Presentation and discussion The session flows naturally to the last session of the day – an open session to discuss and clarify main concepts, issues and questions.

Day 2: Water issues and economic instruments		
Participants' presentation		Review of the previous day
Morning 1	**Water management issues: efficiency, equity and sustainability**	On Day 2, the programme is going into economic and financial instruments. This first session opens the way, and links water management goals with the use of such instruments. Content: Chapter 2 Approach: Divide the session in parts, present and discuss questions, then continue presenting, and so on. Finish with an exercise or short role-play.
Coffee Break		
Morning 2	**Introduction to water economic instruments**	Introduce key economic concepts behind the application of economic instruments for water management. Content: Chapter 3 Approach: This session might be the one with the most academic content in the entire course. Economic principles are important. Keep in mind the level of specific subject knowledge your course participants have. Plan an open presentation with questions and interaction with the audience. Continue with a group exercise or further discussion.
Lunch		
Afternoon 1	**Application of water economic instruments**	As contents are more focused, this session creates a movement between pure concepts and instruments and the broad picture of IWRM. Content: Chapter 4 Approach: Presentation, questions and group exercises
Tea Break		
Afternoon 2	**Case study and group exercise**	A case study with from-the-ground experience is presented. A local guest lecturer might be invited for this. It is important to clear out the goals of the course, the target and the session details in order to get the best out of this presentation. Experiences and lessons are aimed to be known and shared. A group exercise on the application of economic instruments in different sector closes Day 2.

Day 3: Water values and financing instructions		
Participants' presentation		Review of the previous day
Morning 1	**Water valuation methods**	This session is to know about main water valuation methods for supporting the use of economic instruments and to be able to evaluate the pros and cons of using specific water valuation methods in different water management situations. Content: Chapter 3 Approach: Presentation and questions
Coffee Break		
Morning 2	**Application of water valuation techniques**	Showing the complexity and need to implement the concepts is key in the course. In this session, two case studies that show from-the-ground experiences are presented. A group exercise and discussion may follow.
Lunch		
Afternoon 1	**Introduction to finance instruments**	This session explains how the main constituent parts of the water sector obtain their finance and considers how a national financing structure that is coherent, adequate and sustainable can be put together. Content: Chapter 5 Approach: Presentation, questions and group exercises
Tea Break		
Afternoon 2	**Application of water financing instruments**	This session examines in greater detail than Chapter 5 the main financing options for a water system, and evaluates the relevance of these financing instruments for different purposes. Content: Chapter 6 Approach: Presentation, questions.

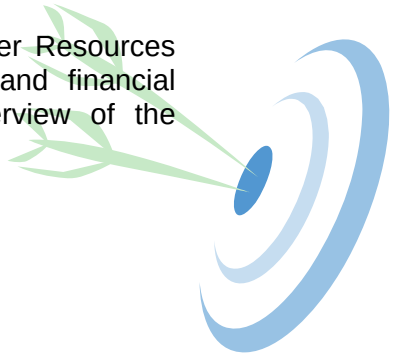
Day 4: Water values and financing instructions		
Participants presentation		**Review of the previous day**
Morning 1	**Applying financial instruments**	This session continues in depth with what has been seen in the last session on the previous day. Content: Chapter 6 Approach: Presentation and questions The session is followed by one case study that presents experiences and lessons learnt in the use of such instruments.
Coffee Break		
Morning 2	**Group exercise: role-play on the application of financial instruments**	A suggestion for a role-play is presented in Session Outline 6. Consider enough time for the role game, including time at the end for participants to share their insights and raise questions and key ideas.
Lunch		
Afternoon 1	**Capital markets**	This session explores capital markets, and legal forms used for funding in complement with financial instruments. Content: Chapter 7 Approach: Divide the session in parts, present and discuss questions, then continue presenting, and so on. Finish with an exercise or role-play.
Tea Break		
Afternoon 2	**Incorporating economic and financial instruments in IWRM plans, and financing IWRM plans**	This session is to understand the financing challenge in implementing an IWRM plan; but first, participants must have an appreciation of the main stages in the process of plan preparation and the difficulties encountered in IWRM plan preparation. Content: Chapter 1 as general IWRM knowledge Cap-Net and GWP training manual on IWRM plans could be used; and in this way, the specific content treated in this manual is linked with a concrete IWRM implementation need, namely plans. A group exercise for this session is presented following Chapter Outline 8. Approach: Presentation, questions and group exercises

Day 5: Financing strategies Course closure		
Participants presentation		Review of the previous day.
Morning 1	**Financing local initiatives**	This session is to deepen participants' understanding of the issues connected with local finance mechanisms in the context of locally provided water, sanitation and hygiene services. Content: Chapter 8 Approach: Presentation and questions The session is followed by one case study that presents experiences from the ground, and a group exercise or open discussion.
Coffee Break		
Morning 2	**Group work: strategic actions for implementation**	Participants grouped by country or region work together to present a strategic plan to implement the course concepts in favour of IWRM implementation.
Lunch		
Afternoon 1	**Group presentation and discussion**	Groups present in a plenary session, and receive feedback from participants and facilitators.
Tea Break		
Afternoon 2	**Course evaluations and feedback from participants** **Final words, closure and course certificates**	Participants complete a course evaluation. Later, during an open session, they provide feedback to the facilitators and organisers. Expectations from Day 1 are revised. Were they met? The course finishes with final words, and participants receive their certificates.

CHAPTER OUTLINE 1
INTRODUCTION TO INTEGRATED WATER RESOURCES MANAGEMENT

Goal

The goal of Chapter 1 is to introduce the concept of Integrated Water Resources Management (IWRM), its principles, the importance of economic and financial instruments in achieving IWRM and to provide a preliminary overview of the challenges in implementing IWRM.



Learning objectives

At the end of this session, participants will:

- Be able to describe the meaning of IWRM and its main principles;
- Understand the main reasons for taking an IWRM approach;
- Understand the importance of economic and financial instruments in IWRM; and
- Be able to describe the main challenges in implementing an IWRM strategy in his/her country.

Learning methods

The manual addresses economic and financial instruments for integrated water resources management. It is therefore essential that the meaning of IWRM and the importance of a water management framework are well understood or refreshed.

Guided by the structure of Cap-Net IWRM tutorial, the session is a continuous exchange between participants and the facilitator, and between participants on relevant subjects. The presentation menu provides introductory questions on IWRM issues. This method appears to be effective when there is a basic level of understanding but with substantial differences between participants. A continuous dialogue extracts knowledge on the subject that exists in the group and provides necessary clarifications for those with minimum understanding of the subject.

Three PowerPoint presentations are provided to be delivered along with the contents of Chapter 1. Further readings, including the text from Cap-Net IWRM tutorial, are provided in the “Further reading” section in the CD.

Questions within the chapter contents should be considered as discussion points and be worked on by means of buzz groups.

Key terms related to this chapter

Capacity building: Capacity building is the process of implementing institutional development. It provides tools and knowledge to initiate, guide and support institutional development. Most of the activities under institutional development

concern knowledge transfer, skills development, and facilitating the use of these capacities. Capacity is the ability of individuals and organisations or organisational units to perform functions effectively, efficiently and sustainably. This implies that capacity is not a passive state but part of a continuing process.

Gender mainstreaming in IWRM: Addressing gender and water together acknowledges the existing imbalances and stereotypes regarding men's and women's relationship with water management and use. It seeks to ensure that the contributions of both men and women be recognised. To manage water effectively and sustainably, it is important to understand the different roles of men and women and to target action appropriately.

Integrated Water Resources Management may be defined as a systematic process for the sustainable development, allocation and monitoring of water resource use in the context of social, economic and environmental objectives. It is cross-sectoral and therefore in stark contrast to the traditional sectoral approach that has been adopted by many countries. It has been further broadened to incorporate participatory decision making of all stakeholders. The term *integrated management* means a holistic perspective on water resource usage, and therefore management. The term *management* is used in its broadest sense, in that it focuses on the development and management of water resources, which ensure sustainable use for future generations.

Stakeholder: The general term used to describe an agency, interest group, company, individuals, water users, bulk water suppliers and communities or representatives thereof, taking part in IWRM or in the related participatory process

Subsidiarity: The principle of subsidiarity implies that all planning and decision making should be done at the most feasible level.

Needs for the session

- Presentation material, PowerPoint presentations, flip chart, pens and paper
- Discussion points and questions (within the chapter contents)

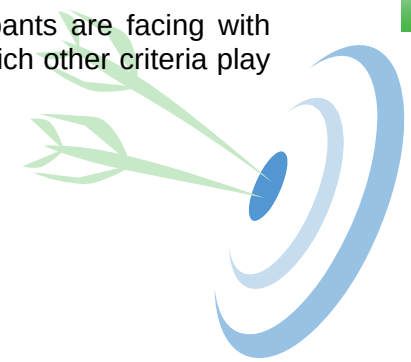
Tips for the session

- Check the knowledge of the participants first to adjust the length of this session. It may be presented as a refresher in an hour, or take the whole morning for a less-experienced group.
- Try to get copies of the IWRM tutorial by Cap-Net to participants in advance so that they come prepared and are better able to discuss.
- Break your presentation every few minutes to get feedback from participants. Use the questions in the manual and Cap-Net tutorial to help you.
- Depending on the region, challenging questions may come, for example, on basic principles of payment for water or gender issues. Facilitate the discussion with participants. Do not try to sidestep the issue, but also do not let it consume too much time.

CHAPTER OUTLINE 2
WATER MANAGEMENT ISSUES AND INSTRUMENTS FOR EFFICIENCY, EQUITY AND SUSTAINABILITY

Goal

The goal of Chapter 2 is to link the water issues that participants are facing with available economic and financial instruments, and to explain which other criteria play a role in decision making in the water sector.



Learning objectives

At the end of this session, participants will:

- Be aware of the problems people face concerning water;
- Be able to learn to appreciate that issues have technical, social, cultural and economic aspects;
- Be aware that this implies a different approach to water management;
- Understand the difference between economic and financial instruments;
- Be able to clarify the difference between efficiency, equity and sustainability in the case of water-related decisions.

Learning methods

Link the water issues that the participants are facing to an outline of what can be expected in this manual. Review in advance the chapter contents and PowerPoint presentation, and organise the session in three parts. After teaching the first part, organise a discussion; and another discussion after the second part. At the end of the third part, there should be time left for an exercise or role-play.

1a. Present issues.

1b. Discuss how these issues are found at the level of each participant's country.

2a. Introduce an economic approach to the issues.

2b. Discuss and share participants' experiences with such an approach.

3a. Draw a number of conclusions and provide an overview of the manual.

3b. Exercise or role-play

Exercise 1: Buzz groups

Form groups: Divide participants into groups by country or region (this is recommended for exercises that consider local-level issues, or plans for implementation). Alternatively, form random groups.

Assign a task: Groups will select a water management issue and develop an approach to solve the issue and list the economic and financial consideration. Discuss which weight should be given to efficiency, equity and sustainability in dealing with this water management issue. How can these objectives be combined?

Report back: After twenty minutes of group work, each group presents its outcomes, and an open discussion that aims at different solutions takes place.

Role-play

The exercise can also be adapted and carried out as a role-play.

We confront two groups with an important issue. We ask them to defend the traditional sectoral way of dealing with this issue, and ask one group to deal with the issue in an integrated way, by using the different criteria suggested. The arguments for the two approaches are presented in the arena of a “stakeholders meeting” (this is where each group plays its role and approach) and differences are discussed.

Time should be allocated to: i) form groups; ii) for each group to prepare its presentation (interests, arguments, exposition); iii) role-play; and iv) insight and review of outcomes.

Discussion points

1. Discuss what the most important water-related issues in your country are.

2. Discuss experiences in your country with a more-economic approach to water, while respecting the cultural value of water and with an open eye for the social problems in your society.

Key terms related to this chapter

Allocative efficiency refers to the use of inputs in a way that maximises total net revenues for firms or consumer surpluses for consumers.

Economic efficiency: Technical and allocative efficiency together are known as economic efficiency. Another definition is: the organisation of producers and consumers is such that all unambiguous possibilities for increasing economic wellbeing have been exhausted. A more loose definition: efficient producers or consumers will be those that get more profit (the producers) or utility (the consumers) from the same inputs, or use fewer inputs for achieving a certain level of profit or utility.

Economic sustainability: An activity can carry on without the need for additional outside financing.

Economic viability: The benefits are bigger than the implied costs.

Environmental sustainability: An activity that does not go at the expense of the environment (Brundlandt: …does not affect the situation for future generations)

Equity: Ensuring that vulnerable groups in society are not excluded from access to basic goods and services, in this case water

Government failure: Government institutions have not been able to deal adequately with water issues.

Operation & maintenance (O&M) are expenditures necessary to let the infrastructure work and to keep it running.

Social sustainability: A solution is socially acceptable in a given social and cultural context.

Technical efficiency is traditionally related to production and it refers to firms getting a maximum output per unit of input, or use minimum input for a given target output.

Total sustainability: The combination of economic, financial, social and environmental sustainability (requiring you to give a weight to the different components, however)

Water cycle: The link between the resource, its use for drinking water and the eventual reuse to allow it to flow back in the resource

Needs for the session

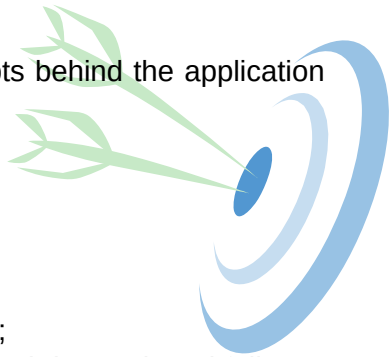
- Presentation material, PowerPoint presentations, flip chart, pens and paper
- Space for group work and role-play
- Discussion points

Tips for the session

- Have a closer look at the table of contents of this manual. You will notice that we move from an introduction to a discussion of the issues, and to the use of different instruments to deal with the issues.
- If there are several participants from the same country, ask them to enumerate regional differences or urban rural differences as far as the issues are concerned.
- Adjust the presentation to the issues identified by the participants.

CHAPTER OUTLINE 3
INTRODUCTION TO ECONOMIC INSTRUMENTS

Goal



The goal of Chapter 3 is to introduce key economic concepts behind the application of economic instruments for water management.

Learning objectives

At the end of this session, participants will:

- Know what the public good aspects of water benefits are;
- Be able to manage basic economic concepts of supply and demand, and full cost recovery;
- Have clear definitions of economic instruments for water management; and
- Be able to analyse specific situations in which economic instruments can be applied to improve water management.

Learning methods

- Start this session with a discussion on special attributes of water benefits as public goods, which is essential for understanding economic instruments for IWRM.
- Later on, introduce the supply and demand concepts, and emphasise the role of economic instruments in affecting these, even when water markets are not feasible.
- Introduce and emphasise the approach of full cost recovery in water management.
- Introduce different water situations for applying alternative economic instruments.
- Explain water valuation methods at the end, and emphasise usefulness for IWRM decision-making.
- Provide exercise for application of main concepts in this chapter.

Discussion points

- The extent to which the special nature of water leads us to change traditional economic concepts of supply and demand
- How feasible water markets are in our countries and what economics has to say for managing water when the market is not there
- Why it is so difficult to achieve full cost recovery in the water sectors
- How useful the concept of opportunity cost of water is for the design and implementation of economic instruments for IWRM
- Which water valuation methods are more useful for making IWRM decisions in developing countries, given their limited resources for measurement and applied research

Key terms related to this chapter

Consumers: Agents who are interested in buying and consuming goods and services in a market. Their consumption preferences will reflect how much they want or value some good or bundle of goods.

Contingent valuation: A method of valuation used to bring out valuation of a given good or resource constructing hypothesised situations for consumers, so they can value different alternatives of the supplied good or service.

Cost-benefit analysis: Techniques to measure and assign benefits and costs to alternative projects or alternatives for some project. Projects or alternatives with higher benefit-cost ratios are more efficient.

Demand: Aggregation of consumers' demands, which is sensitive to preferences, prices and price of substitutes, among other variables

Full Cost recovery: When a producer is charging prices (or tariffs) which are covering all incurred costs in the process of producing the corresponding output

Hedonic price: Valuing a good for which there is no market but which is bundled with another that has a market

Market: Interaction of supply and demand, which forms a market price

Opportunity cost: The foregone benefit from the next available alternative for using scarce resources in a given activity

Private goods: These are the opposite of public goods, show high exclusion and high rivalry, and are mostly goods that are consumed, like food, clothes and manufactures.

Producers: Agents who use some technology to produce outputs, using inputs; will seek to maximise the net income from selling output, and so will be sensitive to the input costs and selling prices

Public goods: These are goods for which exclusion (excluding users) is not feasible or is too costly, and which also show non-rivalry, i.e. the consumption of one unit of the good does not affect the possibility of other users' consumption of the same good. Typical public goods are public light, fresh air, sun, beaches, defence and landscapes.

Supply: Aggregation of producers' supplies, which is sensitive to production technology, prices, input costs and other factors

Technology: The alternative technical combinations of inputs to produce some output

Travel cost method: A method to estimate the benefits of using sites (like parks) from visitors who could not demand more services according to entrance fees. The variation in the costs of travel for visitors is used to estimate the demand function for the corresponding service.

Willingness to pay: How much consumers are willing to pay (in money) for getting

benefits from a given good or service is the basis for the demand curve and the estimation of aggregate benefits.

Needs for the session

- Presentation material, PowerPoint presentations, flip chart, pens and paper
- Space for group work
- Discussion points

Exercise: group work

Form groups: Propose four situations in which the demand for water services is higher than the supply, and in which case a water authority needs to take decisions to solve the problem. Participants should organise in groups, choose each situation and identify:

- Public good features of the type of water benefit involved
- Most likely cost structure of the supplying industry
- Features of the behaviour of producers and consumers
- The scope for cost recovery policies for solving the problem
- Potential use of economic instruments to solve the gap between supply and demand
- What water valuation method can be used to help in decision making

Report back: Members of each group will present the results of their exercise to the rest of participants.

CHAPTER OUTLINE 4
APPLICATION OF WATER ECONOMIC INSTRUMENTS

Goal

The goal of Chapter 4 is to introduce the application of water economic instruments that are aimed at achieving the goals of integrated water resources management, which include equity, efficiency and environmental sustainability.

Learning objectives

At the end of this chapter, participants will be able:

- To understand the importance of economic instruments in achieving the goals and objectives of IWRM, and to tackle water management problems;
- To understand the evaluation criteria that may be applied in designing economic instruments;
- To understand the various types of economic instruments;
- To discuss multiple uses and sectors and how economic instruments are applied to reconcile competition for and allocation of water resources; and
- To discuss the pros and cons of economic instruments.

Learning methods

- Presentation, open discussion and sharing of opinions and questions (see questions for discussions within the chapter content.)

Exercises

Exercise 1: Group work

Form groups: Divide participants into groups by country or region (this is recommended for exercises that consider local level issues, or plans for implementation). Alternatively, make random groups.

Assign a task: Select two or three of the leading water management issues in your country. *How can economic instruments contribute to managing these problems?* Set out the pros and cons of using pollution charges as a method of tacking water pollution. *Are other methods likely to be more effective? What are the preconditions for a successful use of pollution charges?* Propose a set of measures for dealing with drought. *What role should water pricing and other market instruments play?*

Report back: After twenty minutes of group work, each group presents its outcomes, and an open discussion that aims at different solutions takes place.

Exercise 2: Group work

Form groups: Divide participants into groups by country or region (this is recommended for exercises that consider local-level issues, or plans for implementation). Alternatively, form random groups.

Introduction and task:

There is an urban area with three main uses of water: domestic, industrial and waste assimilation. There are available sources for additional water, but exploiting them will require implementing a very expensive water project. The city authority is facing the following water-related problems:

- Forty percent of the city's population do not have access to the water service (getting it from vendors).
- Domestic and industrial users pay water tariffs that are 50% and 70% below full cost recovery.
- There is no treatment of used water in the city, so highly polluted water is used by other sectors located downstream of the city.

The city water authority seeks to solve these problems by using economic instruments, and the group has to come up with a proposal for implementing these instruments. The group has to present the following:

- Evaluation of each instrument in terms of criteria discussed in the session;
- A set of recommended economic instruments, and the problem to which each of these will be applied; and
- Projected impacts on reducing problems.

Report back: After forty minutes of group work, each group presents its outcomes, and an open discussion that aims at different solutions takes place.

Key terms related to this chapter

Demand management: Inducing changes in demand for water by using economic instruments, rules and regulations.

Economic efficiency: Technical and allocative efficiency together are known as economic efficiency. Another definition is: the organisation of producers and consumers is such that all unambiguous possibilities for increasing economic wellbeing have been exhausted. A more loose definition: efficient producers or consumers will be those that get more profit (the producers) or utility (the consumers) from the same inputs, or use fewer inputs for achieving a certain level of profit or utility.

Enabling environments: Policy formulation, legislative, regulative and institutional reforms that provide support for various actors in the water sector to perform their functions

Environmental sustainability: An activity that does not go at the expense of the environment (Brundlandt: …does not affect the situation for future generations)

Equity: Ensuring that vulnerable groups in society are not excluded from access to basic goods and services, in this case water

Evaluation criteria: The criteria used to design economic instruments so that they meet the criteria of economic efficiency, equity, environmental sustainability, administrative feasibility and political acceptability.

Water markets: These can exist when water rights are tradable among users, both within and across sectors. A real water price may occur when demand and supply interact. These markets are location specific and subject to transaction costs and externalities, so they generally face challenges to achieve efficient and equitable outcomes.

Water subsidies: Water subsidies are used to promote social equity, economic growth and employment, and to increase incomes among various water users.

Water tariffs: Water tariffs are broadly defined as all charges and levies imposed on the user of a service, if such charges bear some direct relation to the provision of the service.

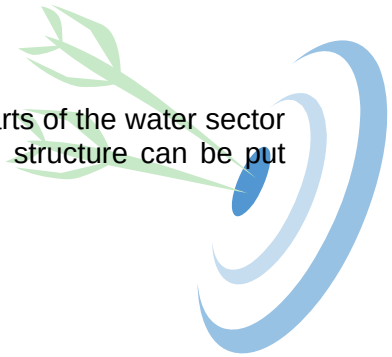
Water taxes: Many public and private investment projects adversely affect water quality and degrade aquatic ecosystems, but many countries do not have standards to control water pollution or the capacity to enforce existing legislation. Some countries levy environmental taxes on wastewater effluent discharged directly into natural watercourses. This practice is based on the Polluter Pays principle.

Needs for this session

- Presentation material, PowerPoint presentations, flip chart, pens and paper
- Discussion points
- Space for group work

CHAPTER OUTLINE 5
INTRODUCTION TO WATER FINANCE

Goal



The goal of Chapter 5 is to explain how the main constituent parts of the water sector obtain their finance, and to consider how a national financing structure can be put together that is coherent, adequate and sustainable.

Learning objectives

At the end of this chapter, participants will be able:

- To understand the variety and complexity of a national water sector and the specific financial needs of its component parts;
- To differentiate financial and economic instruments; and
- To adopt a critical approach to different financing options.

Learning methods

- Presentation, open discussion and sharing of opinions and questions (See questions for discussions within the chapter content.)
- Exercise

Exercise: group work

Form groups: Divide participants into groups by country or region (this is recommended for exercises that consider local-level issues, or plans for implementation). Alternatively, form random groups.

Assign a task: Break down your country's water sector into its main constituent parts and draw up an inventory of the sources of finance for each (distinguishing recurrent spending from capital investment items). *Is the current financing structure rational and sensible?* Suggest ways in which it could be improved. Make suggestions for attracting more financial resources into water.

Report back: After twenty minutes of group work, each group presents its outcomes, and an open discussion that aims at different solutions takes place.

Key terms related to this chapter

Build–Operate–Transfer (BOT): A form of private sector participation contract in which a company is awarded a concession to build a facility, financed on its own balance sheet, and recovering costs and profit through operating the facility for a period of years, after which the facility reverts to public ownership

Capital costs: The cost of large items of investment in infrastructure, resource development, major repairs and modernisation

Economic instrument: A measure intended to influence users' behaviour towards water and the allocation of water resources

Externalities: The economic and financial impact of A's action on the costs or prices of B, C and D, not taken into account in A's original decision, nor directly reflected in A's own balance sheet

Financial instrument: A means of generating financial revenues for the operation and development of the water sector

Investor: A person or company sharing the risk of a project or corporation, usually by purchasing equity shares

Private Sector Participation (PSP): Involvement of private businesses in the management or operation of water undertakings, e.g. by sub-contracting specific services, contracts for management and operations, leasing public assets, concessions to finance, operate and eventually transfer back to public hands systems and facilities

Privatisation: The transfer (e.g. sale) of ownership of public assets into private hands

Recurrent costs: The continuous expenses involved in operating all parts of the water sector, including wages and salaries, fuel, electricity, chemicals, spare parts and minor capital items necessary to maintain and repair systems

Sub-sovereign bodies: Layers of public administration and autonomous agencies below the level of central government (e.g. state and local governments, parastatal entities and utilities)

Needs for this session

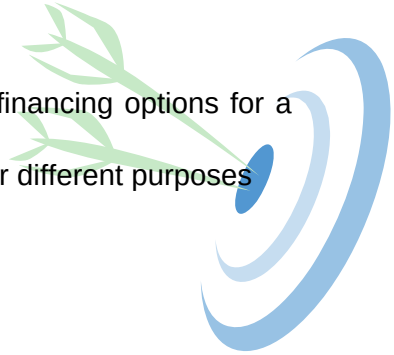
- Presentation material, PowerPoint presentations, flip chart, pens and paper
- Space for group work
- Discussion points

Tips for this session

- Encourage participants to challenge generalisations and "conventional wisdom". Insist on a critical approach.
- Promote competition within the audience by dividing them into groups to carry out the same exercises and getting rival presentations.
- Role-play is appropriate to deal with the chapter content.
- The questions posed in text boxes can be addressed to the audience.

CHAPTER OUTLINE 6
APPLICATION OF FINANCIAL INSTRUMENTS

Goal



- To examine in greater detail than in Chapter 5, the main financing options for a water system
- To evaluate the relevance of these financing instruments for different purposes

Learning objectives

At the end of this chapter, participants will be able:

- To understand the pros and cons of each financing option and the circumstances in which each is applicable;
- To combine different options to provide a coherent financial “architecture”; and
- To grasp the interdependence of the financing mechanisms and how synergy can be produced.

Learning methods

- Presentation, open discussion and sharing of opinions and questions (See questions for discussions within the chapter content.)
- Exercise/role-play

Role-play

Form two groups: one group to represent the Central Government and the other to represent a local authority. The local government wants to improve access to water and sanitation for its population. Both groups will attend a round table to negotiate an appropriate funding scheme. Groups have twenty-five minutes to prepare their arguments before the round table begins. One of the course facilitators or one of the participants will act as moderator.

The round table takes place for not more than thirty minutes. Afterwards, all participants share their insights and key issues, and further questions are raised and identified.

Suggestions:

Central government:

- Do you want to keep control of financing flows, or are you happy for decisions to be decentralised?
- How would you monitor the use of funds? How would you control local indebtedness?
- Are you confident of having access to new money (e.g. from aid, budget and bonds), or do you prefer to leave local authorities to get the finance?

- Are you willing to offer a sovereign guarantee for local fundraising?

Local authorities:

- Where do you stand on the question of dependence on central government versus local autonomy?
- Do you have the capacity to negotiate with funders?
- How would you ensure repayment capacity for loans or equity?
- Does central government funding flow down to your level easily? Are there blockages?

Key terms related to this chapter

See key terms for Chapter 5.

Needs for the session

- Presentation material, PowerPoint presentations, flip chart, pens and paper
- Space for group work/role-play
- Discussion points

Tips for this session:

- Encourage participants to challenge generalisations and "conventional wisdom". Insist on a critical approach.
- Promote competition within the audience by dividing them into groups to carry out the same exercises and getting rival presentations.
- Role-play is appropriate to deal with the chapter content.
- The questions posed in text boxes can be addressed to the audience.

CHAPTER OUTLINE 7
APPLICATION OF FINANCIAL INSTRUMENTS

Goal

Goals of Chapter 7 are:

- To look at the availability of a capital market at the national level and the possibility to use it for water resources management
- To identify the different legal forms used for funding, which go with the different financial instruments that can be used in the water sector and have been introduced in the previous chapters
- To indicate how such a local capital market can be developed over time if the right attitude and policies are in place

Learning objectives

At the end of this chapter, participants will be able:

- To make the participants aware of the importance of developing local capital markets;
- To learn to appreciate the importance of legal constructions to secure finance in the water sector;
- To provide arguments in favour and against private sector involvement in infrastructure, in the water sector, and illustrate this in the water sector;
- To show the importance and composition of foreign capital flows;
- To identify financial risks and discuss possibilities to mitigate risks; and
- To understand the reforms that need to be carried out if you want to develop a local capital market.

Learning methods

Review in advance the chapter contents and PowerPoint presentation and organise the session in three parts. After teaching the first part, organise a discussion, and after the second part another discussion. At the end of the third part, there should be time left for an exercise or role-play. See questions for discussions and/or buzz groups within the chapter content.

Link the water issues that the participants are facing to what can be achieved through mobilising capital for the sector from the local capital market. Explain that, with different sources of finance, you may also have different legal forms, and that this requires a legal framework.

1a. Present the distinction between legal forms and financing instruments.
1b. Introduce the notion of capital markets.
1c. Discuss the importance of the capital market in their country.

2a. Introduce the Indian experiences with such an approach.
2b Discuss the mechanism to develop a local capital market.

3a. Introduce the experience in Africa with bond markets.
3b. Discuss how to develop a local capital market.
3c. Exercise or role-play (see below)

Exercises

Buzz groups

List the arguments in favour and those against Private sector involvement in infrastructure provision in developing countries.

Role-play

We confront two groups with an important issue and ask them to defend the traditional financial way of dealing with the issue, and ask one group to deal with the issue in an alternative way, through using the local capital market. The arguments for the two approaches are presented and the differences are discussed.

Groups have twenty-five minutes to prepare their cases, and they are encouraged to convince an audience that will take a decision. Groups have ten minutes to present their cases and proposals and then another five minutes to respond to the other group proposal. A further fifteen minutes is left for open questions.

Once the role-play is finished, the participants have thirty minutes to share their experiences, insights and to identify key issues and new questions.

Discussion points

1. Discuss the issue of having the legal regulations in your country necessary to use the more sophisticated financial instruments.

2. Discuss your experiences with a more sophisticated way of financing the water sector, while indicating the advantages and disadvantages of each approach.

Key terms related to this chapter

Bonds are a fixed-term debt with a fixed rate of interest and a priority treatment in case of bankruptcy.

Build–Operate–Lease (BOL) – like BOT, but continues with leasing at the end.

Build–Operate–Own (BOO) – like BOT, but ownership at the end.

Build–Operate–Transfer (BOT): A form of private sector participation contract in which a company is awarded a concession to build a facility, financed on its own balance sheet, and recovering costs and profit through operating the facility for a period of years, after which the facility reverts to public ownership

Capital markets: The place where demand and supply for capital meet

Concession gives a private contractor or concessionaire the overall responsibility for the services to be provided, including operation, maintenance and management, as

well as capital investments for the expansion of services.

International capital market: Places where international suppliers of capital are brought in contact with international demand for capital

Joint ventures: UN (1990) defines a joint venture as a flexible instrument of economic cooperation between enterprises.

Legal instruments for obtaining finance: A legal agreement that sets out the conditions of cooperation between different parties as the basis for engaging in financial commitments

Management contract is a contract that outsources the management of a facility to a private entity for a limited period.

Municipal bond market: Part of the capital market where Municipal bonds are issued and bought.

Municipal development fund is a pool of money operated at a level above that of the individual municipality, for investment in urban infrastructure, services and enterprise through municipal government or its subsidiaries.

Public–Private Partnerships (PPPs) may be defined as cooperative ventures between a public entity and a private party, aiming to realise common projects in which they share risks, costs, and profit.

Securitisation: A specialised financing institution can securitise any cashflow from loans provided for a pool of successfully operating infrastructure projects.

Service contracts refer to arrangements whereby a public authority remains responsible for operation and maintenance of the water supply system, but where specific activities are contracted out to private enterprises for a fee.

Shares are participations in the capital of an enterprise.

Venture capitalists are providers of capital who participate in risky enterprises, hoping to get a high return when the company is turned into a success and is then sold.

Needs for this session

- Presentation material, PowerPoint presentations, flip chart, pens and paper
- Space for group work/role-play
- Discussion points

Tips for this session

- Have a closer look at the table of contents of this manual. You will notice that we move from an introduction to a discussion of the issues, and to the use of different instruments to deal with the issues.
- If there are several participants from the same country, ask them to enumerate regional differences or urban rural differences as far as the issues are concerned.
- Adjust the presentation to the issues identified by the participants.

CHAPTER OUTLINE 8
LOCAL FINANCING MECHANISMS FOR WATSAN SERVICES DELIVERY

Goal

To deepen participants' understanding of the issues connected with local finance mechanisms in the context of locally provided water, sanitation and hygiene services through:

Learning Objectives

At the end of this session, participants will:

- Be able to reflect upon their own experience with and knowledge of local finance mechanisms;
- Be familiar with various finance options and their respective pros and cons;
- Be able to consider the conditions that best provide enabling environment for local finance arrangements; and
- Be able to identify main constraints and opportunities for establishing effective local finance mechanisms.

Learning Methods

- Presentation, open discussion in buzz groups and small groups, sharing of opinions, participatory clustering and categorisation, and brainstorming

Exercises

Exercise 1: Participants' reflect on their own experience with local financing mechanisms in Buzz groups.

Form Buzz groups (2 minutes): Have participants pair off in twos with the person next to them.

Buzz Group & METAPLAN Activity (5–10 minutes): In twos, participants share their experience with local-level financing mechanisms and write one per METAPLAN card.

Facilitated clustering: Cards are posted on central Flip Chart/Wall. Participants identify main financing mechanisms. Sub-types are clustered together under main types. The facilitator fills in any remaining gaps.

Exercise 2: Buzz groups answer the question: Why are financing and cost recovery critical to improving local-level WASH services delivery?

Form Buzz groups (two minutes): Have participants pair off (in twos) in different partnerships to previous buzz activity.

Buzz Group & METAPLAN Activity (5–10 minutes): Answer the question on METAPLAN cards: Why are financing and cost recovery critical to improving local-level WASH services delivery? Cards are collected and pasted centrally.

Report back (10 minutes): Groups present results **very briefly** and clarify questions.

Summation: The facilitator uses slides 9 to 12 on WHY financing and cost recovery are important to WASH services, and covers points not addressed in Buzz groups or plenary sessions.

Exercise 3: Structured reading in Buzz Groups

Form Buzz groups (2 minutes): Have participants pair off in twos in different partnerships to previous buzz activity.

Buzz Group: Read case studies, and briefly summarise the approach taken in given contexts.

Report back (10 minutes): Buzz groups present results **very briefly** and clarify questions in a plenary discussion.

Plenary discussion: Clarify different microfinance mechanisms.

Exercise 4: In Buzz groups, participant, identify key elements of an enabling environment.

Buzz groups & METAPLAN: In groups of two participants, list key elements of an enabling environment on METAPLAN cards – one per card.
Gathering & Clustering: METAPLAN cards are centrally displayed. Facilitator guides groups in clustering cards into main categories of enabling environment, including categorising along 'policy', 'intermediate' and 'community' levels.

Wrap up: Facilitator uses slide 24 to wrap up, covering points not yet addressed by BUZZ Groups.

Exercise 5: A plenary brainstorm session to identify constraints, opportunities for effective and sustainable local financing mechanisms

Brainstorm (10 minutes): Encourage individuals and groups to articulate as many thoughts, responses, ideas about constraints, opportunities for effective and sustainable local financing mechanisms as they possibly can within a fixed amount of time. Brainstorming is an opportunity to give free rein to the imagination. There are no rights or wrongs and no judgement is placed on any comments.

Gathering & displaying results: Different visual techniques (e.g. METAPLAN cards and spider-web maps) can be used with groups of up to twelve persons, with a facilitator encouraging and capturing the results of the brain writing, brain mapping, buzz groups, group discussion and play.

Wrap up: Facilitator uses slides 25 to 28 to conclude the session, covering additional points not addressed in the brainstorm session.

Key terms related to this chapter

Demand-led – Development process where beneficiaries are involved in, and ideally lead, decision making about technology, governance and finance

Local financing mechanisms (for WASH services) – Any means through which finance is provided for covering sustainable operation, delivery and maintenance costs of local WASH services. This can include grants, loans, equity, guarantees and insurance, structured in a variety of ways to suit the risk profile of the recipients.

Microcredit – The principle of giving small loans to the very poor to help them generate an income of their own

Microfinance – (Broader than microcredit) It incorporates savings and insurances as well as credit, and means literally a small amount of finance is provided as well as other diverse financial services to low-income people.

Pooled resources or revolving funds – A pool of capital created and reserved for specific activities

Tariffs – Fees charged for water or sanitation service provision. Tariffs can be charged at the full cost of providing service (or higher, or lower), depending on the subsidy scheme.

Needs for the session

Session 9 section of reader and accompanying PowerPoint Presentation

- METAPLAN (ZOPP) cards, markers, sticky tape and flip chart paper

Tips for this session

It is important to emphasise throughout that it is not the mechanism itself that is important, but how it has been developed and applied for a given context and what the impacts are for the end-users, especially for the poor.

FINANCING IWRM PLANS

A GROUP EXERCISE

It is strongly recommended that the course should consider the issue of IWRM plans and specifically, their financing. Cap-Net and GWP developed a comprehensive training package on this very important issue. The package is freely available on CD-ROM, as well as through the Cap-Net web site, www.cap-net.org. Course participants and trainers are highly encouraged to review this material and to deliver specific courses in this theme, as another relevant step in capacity building for IWRM.

The sample course programme considers a session on the afternoon of Day 4 for this subject. The goal of this session is to help persons who are involved in developing a water resources management plan for their own countries to understand the financing challenge in implementing the plan; however, they must first have an appreciation of the main stages in the process of plan preparation and the difficulties encountered in IWRM plan preparation.

Exercise

Programming the planning cycle, and discuss financing plan implementation.

Form groups (5 minutes). Divide participants into groups by country or region. Alternatively, form random groups if it is a theoretical exercise or all participants are from one country.

Assign a task (30 minutes). Your group has been asked to prepare an IWRM plan for the river basin for which you are responsible as water managers. Identify all the planning phases involved in such a process, elaborating on all the tasks that are involved and the difficulties you may encounter at each phase. Develop an outline programme with a timeframe for an IWRM plan through the whole cycle. *What changes are needed (in relation to the current, sectoral approach) to go through the planning process? What financing options will you consider?* Provide reasoned arguments for your choice of financing the planning process.

Report-back and open discussion (25 minutes): Give clear guidance as to how the report-back is expected to happen, including the time for each presentation. Make sure the necessary materials are available to the reporter (computer, flip chart or overhead sheets, as appropriate).

FACILITATORS NOTES (I)
PREPARING AND STARTING THE COURSE

I. Before the course

As first step, it is advisable to have an assessment of the resources that your organisation has to deliver the course. *Have the course goal, approach, target group, and programme been identified? Are facilitators and trainers available? When and where will the course be delivered? Is there enough time available to plan, prepare, announce and deliver the course? Have all costs and their sources been considered?*

Tips for the venue

As much as possible, always look for a room with daylight, which is large enough for all to move easily and feel comfortable. Temperature and fresh air are key for participants' concentration. They have a long week ahead and need the best ambience for their training! A different room for group work will generate movement and a change of scenery, which will also contribute to participants' refreshment. In addition to coffee and tea during such breaks, water should be available at all times.

If all these things have been carefully thought through and taken care of, well done! You are now ready to deliver the course.

II. Programme and sessions

A well-prepared course programme must be available before the course, and sessions should be clearly assigned to specific facilitators.

It is always good to provide for some sessions by participants. As from Day 2 of the course, the first half hour could be for a pair of participants (identified beforehand) to share a recapitulation of the previous day. This is positive to assign a responsibility to different participants, and to start the day with a refreshment of the contents seen before.

Further sessions for open discussions and clarification are also positive, to generate a break between content presentations and to allow some time for things to flow. Nevertheless, these sessions should be carefully facilitated.

Balance should be looked for when designing the programme. Content sessions must not take over the course. They should be complemented with sessions for discussion and clarifications, case study presentations, and a number of group exercise sessions.

It is always good to begin the course with a "welcome" session, and then finalise with an open discussion where participants will evaluate the course and give feedback to the organisers.

A field trip should only be part of a course programme when it will added value to the course in terms of content, experience and possibility of interaction with from the ground experiences and stakeholders. It must be carefully planned.

For content sessions, a balanced distribution of time is recommended, generally 1/3 for presentation, 1/3 for questions and 1/3 for exercises (when applicable). Considering the participants' knowledge and experience is key, especially for IWRM-related workshops that aim for the effective implementation of these water management principles. Some specific recommendations and more facilitators' notes (including learning tips and energisers) then follow.

III. Needs for this session

The opening of a course is always an important time and an opportunity to ensure that expectations are in line with the course purpose. Use the opportunity of the first one to two hours:

- To introduce the course and its objective, and explain why it is being held at that location;
- For participants to get to know one another;
- Build rapport and team spirit among the participants;
- Introduce the host organisation and any other partners;
- Level off expectations for the course and link them with the course content and overall programme schedule; and
- Discuss the workshop management issues starting times, etc.

1) Welcome and warm up.

Some ideas and tips:

Think what it must be like to be someone coming to the workshop, training or course. What problems or worries are they likely to have? Are there some who will have special problems? What can you do to help them? What can you ask others to do to help?

- ✓ Put up welcome notices.
- ✓ Be participatory from the start. Ask early comers to help. There are often things to do, like moving chairs and tables, tearing up paper and finding someone who can make equipment work…
- ✓ Go for a relaxed and friendly start. Try to be free and relaxed yourself. What happens in the welcome and start can set the tone for the rest of the time.
- ✓ Make those who arrive late, feel welcome. Ask others to brief them on what has happened so far and to help them in other ways.

2) Checklist for starting

This is a checklist, not a sequence. Do things your own way, in whatever order makes sense to you.

- Welcome
- Administration and logistics (meals, hotel, transports, etc.)
- Expectation, hopes and fears

- Background and purpose: It often helps to present or discuss objectives, even if these have been presented to the group beforehand.
- Outline of the programme and/or process.
- Information – on documents, sources, videos, etc.

3) Expectations and hopes

To encourage participants to think about what they expect; and for your information, ask them what their expectations, hopes or fears are.

Options include

- Ask participants to take cards, to write down their expectations and to stick the cards up on a wall or board.
- Ask pairs or small groups to write expectations (or hopes and fears) on cards (one item per one card), which are then sorted on the ground, stuck up and displayed.
- Contributions can be great. They can also be too many, or embarrassingly inappropriate. Be cautious.

The expectations, hopes and fears can be addressed and commented on before starting. There are usually some humorous fears. Course organisers may wish to come back to these cards during the course, as a way to visualise the advance of the course with these expectations. On the last day of the course, when participants are asked to give feedback on the course, the expectations from day one may be reviewed and commented again. Were they met?

4) Mutual introductions

Participants pair off, introduce themselves to each other, and then each introduces the other to the whole group. The pairs can be formed in different ways:

- Random or self-selected
- Preset by the facilitator (two cards, one name per card, can be picked up, and the two whose names are on those cards find each other and form a pair).
- Deliberate diversity mix: e.g. one person who has been at an earlier workshop, and one who has not; or one woman and one man; one old and one young; or ones from different countries.
- Hat selection: Each person writes personal details (e.g. date of birth, height, favourite colour, favourite drink, hobby and favourite film star) on a piece of paper. The pieces of paper are folded and mixed in a hat, and each person draws one and searches for the originator.

Variant

This can be done with threes instead of pairs (A introduces B, B introduces C, and C introduces A).

5) Name and throw

To help learn one another's names in an enjoyable and non-threatening manner (suitable for groups of between 20 and 25)

You need big, legible name labels and a rubber ball (or a ball of string for the variant). Ensure everyone's nametags are visible from a distance. Stand in a circle. Whoever holds the ball calls out the name of another and throws the ball to her or him. She or he then does the same for someone who has not yet had the ball. Continue until everyone has taken part.

Variant
Use a ball of string, holding the string. At the end, a web will be connecting everyone. This is particularly interesting for networks!

FACILITATORS NOTES (II)
MODERATION & INNOVATIVE LEARNING TIPS

I. Buzz group: everybody gets involved

To activate a group/audience (any size). Buzz groups are made up of two to four people who work together for a short time (5–10 minutes) to discus a topic or to do a little assignment.

Buzz groups get their name from two characteristics of their activity:

1. There is generally quite a noisy buzz in the room.
2. Working in this way sets ideas buzzing in the group and in people's minds.

Tips

It is a simple way to 'neutralise' people who dominate the discussion in plenary sessions. Using buzz groups in the beginning of a session helps to create an informal atmosphere.

There are many questions raised in each of the chapters of this manual. Use buzz groups in your course for participants to think about these questions.

Objectives

Some reasons to use buzz groups:

- It helps to maintain interest and to get people involved.
- It stimulates their learning by discussing and expressing their thoughts.
- It offers information and experiences to further build on during the lecture or training session.
- It helps participants to become acquainted with one another.

Outputs

- An energised, involved group or audience
- Interactive input for the programme

When to use

- Especially in larger groups where some interaction and participation are needed
- Any size of group
- 5–10 minutes

Process

- Form buzz groups of two to four people by asking everybody to turn to their neighbours, without moving from where they are sitting.
- Give them a simple task or question, which takes between five and ten minutes (maximum).
- After completing their task, ask some people to report or express their experiences.

II. Metaplan: A highly visible brainstorming and discussion technique

"Metaplan" is a visual brainstorming technique that incorporates elements of brain writing, brain mapping, buzz groups, group discussion and play, for (sub-) groups of up to twelve persons. It is an effective and efficient way to involve all participants.

Metaplan creates an open and informal atmosphere in which all participants can contribute. The outputs are directly visible and can easily be used for reporting.

When to use

In general, for groups of up to twelve persons. Larger groups can be split up in subgroups, each of which has its own Metaplan session. One session takes between 30 and 45 minutes, but in many cases, a cycle of three to five sessions is required to fully explore and discuss a topic.

Process

- **Start with a question**

  Write the question on top of a large sheet of paper. Verify the understanding of the question or issue at hand. Starting with the right question is extremely important.

- **Visualisation**

  Ask participants to write their ideas, comments, and remarks on post-its/cards. They should use a marker and write readable cards. Only one idea should be written on each card, and participants may write on more than one card.

- **Clustering**

  Collect the cards and randomly read the cards aloud. Let participants do the clustering and stick the cards on a wall according to the clusters formed.

- **Informative contributions**

  If there is a need for more information, allow for an informative contribution. This should take no longer then five minutes. Ask participants to give names to each of the clusters formed.

  The result is a number of clustered answers (following participants' responses and criteria) to the question that was proposed to the group. It is a good process to ensure: (i) everybody participates; (ii) responses are anonymous, which might be good when dealing with a delicate subject.

Needs

- Large sheets of paper
- Post-its or cards, and markers
- Tape to stick the sheets to the wall
- Most convenient are pin boards for sheets and cards, to be more flexible

- A camera to make a report
- A nice environment with enough space for an appropriate setting

III. Brainstorming: An opportunity to give free reign to the imagination through drawing out as many ideas about a topic as possible in a given time

Brainstorming is an opportunity to give free rein to the imagination. There are no rights or wrongs and no judgement is placed on any comments. Brainstorming allows individuals and groups to try to capture all possible ideas or perspectives on a given topic within a given (usually short) amount of time.

Outputs

The outputs are the ideas, thoughts, questions, etc. that are documented somehow (preferably visibly, so that group members can all interact with the outputs as food for further ideas).

General rules

- Do not judge or criticise any ideas.
- Let ideas flow – be imaginative.
- Free wheel – build on other people's ideas.
- Go for quantity, not for quality.
- Clarify items. Expand on an idea without evaluating it.
- Record all ideas, no matter how trivial it might seem.
- As soon as all ideas have been listed, assess and evaluate them openly in a facilitated discussion with all brainstorm participants.

IV. Clever use of PowerPoint presentation

PowerPoint presentations are present in all courses and in most sessions. It is quite a facilitating tool; however, it must be used properly to reach its best results. Here are some tips:

- You will spend on average two to three minutes to explain each slide. Therefore, do not have more than 10–15 slides for a 45-minute presentation.
- Avoid large amounts of text on a slide and do not just read from the slide.
- Put short statements on the slide as headings and reminders to yourself about what to say and in what order.
- Avoid colours that are difficult to read, such as red and yellow.
- Most importantly, check the slides yourself from where the participants will be sitting to see whether they are readable.

For more PowerPoint tips and tools visit:
www.knowwiththeflow.org

V. Energisers

There are times when energy levels fall and attention flags. Towards the end of the morning is one bad time. The early afternoon after lunch is worse. Other difficult times come with heavy presentations, dull topics, and excessive heat. Try to avoid these. Bad times can be moderated with energisers.

Tips for energisers:

- Respect those who do not want to take part.
- With any group that is stiff at first, start gently and gradually work up.
- Take part and set an example yourself.
- Be sensitive to culture, gender and disability.
- If people are tired, you may ask "Do we need an energizer?" and be greeted by "NO!". However, do not be dismayed. Saying "No" itself wakes participants up. Shouted louder and louder it gets more and more air into the lungs. And to justify denying the need some may struggle even more to stay alert.

1) You move, all move

Simple and natural: Change your position. If you are talking, go to another part of the room and talk from there. Most of those not already asleep will shift in their seats, or bend their necks.

Put up posters around the room, and invite all to get up, walk over and stand while you point to them and talk about them. Movement gets circulation going.

2) As and Bs

Stand in a circle. Ask everyone to look around and pick another person, and to raise their hand when they have done that. That other person is their A. Then ask everybody to pick a second person and raise a hand. That second person is their B. When you say, "go", each gets as close as they can to their A and as far away as they can from their B. Then reverse it to *close to B* and *far from A*.

Tip: Stress the need for speed.

3) All move who…

Stand on chairs or sit in chairs (in a circle), with one person (yourself first) in the middle. Say, "All move who…" and then add, for example:

- Are wearing something blue;
- Travelled more than one day to get here;
- Can speak more than two languages;
- Got up this morning before 6 am;
- Had eggs for breakfast;
- And so on…

4) Numbers

Stand in a circle. Count aloud in turn, going around the circle. Anyone who would have said a multiple of five (5, 10, 15, etc.) must clap hands instead of saying the number. Anyone with a multiple of seven or a number with a seven in it must turn around once instead of saying the number. Those who make mistakes drop out. The numbers and actions can vary in many ways; for example less actively by saying other words (not numbers), or more actively by sitting on the floor.

5) Swatting mosquitoes

The room is full of mosquitoes. They are around us – landing and biting. Swat them with your hands – in front, down by your ankles, behind your head, on your face, to the left, to the right, *on your neighbour (?)*.

Option: At the same time, make mosquito noises and shout, “Got it!” (in various languages).

6) Mirrors

Pair off. One person is the actor, the other is the mirror. The mirror does whatever the actor does, mirroring the actions. Continue for a couple of minutes and then reverse roles. Demonstrate with a partner to set an example with appropriate vigour.

7) Role games and group exercises

As noticed, keep a good balance in the course programme, leaving a relevant amount of time for open sessions, sessions for group exercises, buzz groups, and sessions for role-play, which are usually fun and much appreciated.

Tip for role-play: Assign enough time for preparation, for the actual role game, and then for general insight and a review of what happened.

For more interesting tips on energisers and course organisation:

- Chambers, R. (2002). Participatory Workshops. Earthscan, London.

USEFUL RESOURCES AND WEBSITES

There are many self-use learning resources available if you wish to deepen your understanding about IWRM. You will find access to these materials if you visit www.cap-net.org

In addition, the Internet offers valuable tools, references, reports and other documents that will help you to find adequate materials to support your knowledge and training. It just takes some patience and looking in the right direction.

Recommended learning resources

Cap-Net, 2006. Tutorial on Basic Principles of Integrated Water Resources Management. Cap-Net, Capacity Building Network for Integrated Water Resources Management.

Cap-Net and GWA. 2006. Why gender matters. Tutorial for water managers. Cap-Net, Capacity Building Network for Integrated Water Resources Management; GWA, Gender and Water Alliance.

Cap-Net and GWP, 2005. Integrated Water Resources Management Plans. Training Manual and Operational Guide. Cap-Net, Capacity Building Network for Integrated Water Resources Management. GWP, Global Water Partnership.

Recommended web sites

www.cap-net.org (Cap-Net UNDP, International Network for Capacity Building in IWRM)

www.genderandwater.org (Gender and Water Alliance)

www.gwpforum.org (Global Water Partnership)

www.unesco.org/water/wwap/pccp/about.shtml (UNESCO, From Potential Conflict to Cooperation Potential Programme)

www.wsp.org (World Bank, Water & Sanitation Programme)

www.euwi.net (EU Water Initiative)

www.irc.nl (IRC, International Water and Sanitation Centre, The Netherlands)

www.worldwatercouncil.org (World Water Council)

GLOSSARY

Allocative efficiency refers to the use of inputs in a way that maximises total net revenues for firms or consumer surpluses for consumers.

Bonds are a fixed-term debt with a fixed rate of interest and a priority treatment in case of bankruptcy.

Build–Operate–Lease (BOL) – like BOT, but continue with leasing at the end

Build–Operate–Own (BOO) – like BOT, but ownership at the end

Build–Operate–Transfer (BOT): A form of private sector participation contract in which a company is awarded a concession to build a facility, financed on its own balance sheet, and recovering costs and profit through operating the facility for a period of years, after which the facility reverts to public ownership

Capacity building: Capacity building is the process of implementing institutional development. It provides tools and knowledge to initiate, guide and support institutional development. Most of the activities under institutional development concern knowledge transfer, skills development and facilitating the use of these capacities. Capacity is the ability of individuals and organisations or organisational units to perform functions effectively, efficiently and sustainably. This implies that capacity is not a passive state, but part of a continuing process.

Capital costs: The cost of large items of investment in infrastructure, resource development, major repairs and modernisation.

Capital markets: The place where demand and supply for capital meet

Concession gives a private contractor or concessionaire the overall responsibility for the services to be provided, including operation, maintenance and management, as well as capital investments for the expansion of services.

Consumers: Agents who are interested in buying and consuming goods and services in a market. Their consumption preferences will reflect how much they want or value some good or bundle of goods.

Contingent valuation: A method of valuation used to bring out valuation of a given good or resource constructing hypothesised situations for consumers, so they can value different alternatives of the supplied good or service

Cost-benefit analysis: Techniques to measure and assign benefits and costs to alternative projects or alternatives for some project. Projects or alternatives with higher benefit-cost ratios are more efficient.

Demand management: Inducing changes in demand for water using economic instruments, rules and regulations

Demand: Aggregation of consumers' demands, which is sensitive to preferences, prices and price of substitutes, among other variables

Demand-led: Development process where beneficiaries are involved in, and ideally lead, decision making about technology, governance, and finance

Economic efficiency: Technical and allocative efficiency together are known as economic efficiency. Another definition is: the organisation of producers and consumers is such that all unambiguous possibilities for increasing economic wellbeing have been exhausted. A more

loose definition: efficient producers or consumers will be those that get more profit (the producers) or utility (the consumers) from the same inputs, or use fewer inputs for achieving a certain level of profit or utility.

Economic instrument: A measure intended to influence users' behaviour towards water and the allocation of water resources

Economic sustainability: An activity can carry on without the need for additional outside financing.

Economic viability: The benefits are bigger than the implied costs.

Enabling environments: Policy formulation, legislative, regulative and institutional reforms that provide support for various actors in the water sector to perform their functions

Environmental sustainability: An activity that does not go at the expense of the environment (Brundlandt: …does not affect the situation for future generations)

Equity: Ensuring that vulnerable groups in society are not excluded from access to basic goods and services, in this case water

Evaluation criteria: Those criteria used to design economic instruments so that they meet the criteria of economic efficiency, equity, environmental sustainability, administrative feasibility and political acceptability.

Externalities: The economic and financial impact of A's action on the costs or prices of B, C and D, not taken into account in A's original decision, nor directly reflected in A's own balance sheet

Financial instrument: A means of generating financial revenues for the operation and development of the water sector

Full Cost recovery: When a producer is charging prices (or tariffs) which are covering all incurred costs in the process of producing the corresponding output

Gender mainstreaming in IWRM: Addressing gender and water together acknowledges the existing imbalances and stereotypes regarding men's and women's relationship with water management and use. It seeks to ensure that the contributions of both men and women be recognised. To manage water effectively and sustainability, it is important to understand the different roles of men and women and to target action appropriately.

Government failure: Government institutions have not been able to deal adequately with water issues.

Hedonic price: Valuing a good for which there is no market but which is bundled with other that has a market

Integrated Water Resources Management may be defined as a systematic process for the sustainable development, allocation and monitoring of water resource use in the context of social, economic and environmental objectives. It is cross-sectoral and therefore in stark contrast to the traditional sectoral approach that has been adopted by many countries. It has been further broadened to incorporate participatory decision making of all stakeholders. The term *integrated management* means a holistic perspective on water resource usage and therefore management. The term *management* is used in its broadest sense in that it focuses on the development and management of water resources, which ensure sustainable use for future generations.

International capital market: Places where international suppliers of capital are brought in contact with international demand for capital

Investor: A person or company sharing the risk of a project or corporation, usually by purchasing equity shares

Joint ventures: UN (1990) defines a joint venture as a flexible instrument of economic cooperation between enterprises.

Legal instruments for obtaining finance: A legal agreement that sets out the conditions of cooperation between different parties as the basis for engaging in financial commitments

Local financing mechanisms (for WASH services) – Any means through which finance is provided for covering sustainable operation, delivery and maintenance costs of local WASH services. This can include grants, loans, equity, guarantees, and insurance, structured in a variety of ways to suit the risk profile of the recipients.

Management contract is a contract that outsources the management of a facility to a private entity for a limited period (usually up to five years).

Market: Interaction of supply and demand, which forms a market price

Microcredit – The principle of giving small loans to the very poor to help them generate an income of their own

Microfinance – (Broader than microcredit) It incorporates savings and insurances as well as credit, and means literally a small amount of finance is provided as well as other diverse financial services to low-income people.

Municipal bond market: Part of the capital market where Municipal bonds are issued and bought

Municipal development fund is a pool of money operated at a level above that of the individual municipality, for investment in urban infrastructure, services and enterprise through municipal government or its subsidiaries.

Operation & maintenance (O&M) are expenditures necessary to let the infrastructure work and to keep it running.

Opportunity cost: The foregone benefit from the next available alternative for using scarce resources in a given activity

Pooled resources or revolving funds – A pool of capital created and reserved for specific activities

Private goods: These are the opposite of public goods, show high exclusion and high rivalry, and are mostly goods that are consumed like food, clothes, manufactures, etc.

Private Sector Participation (PSP): Involvement of private businesses in the management or operation of water undertakings, e.g. by sub-contracting specific services, contracts for management and operations, leasing public assets, concessions to finance, operate and eventually transfer back to public hands systems and facilities

Privatisation: The transfer (e.g. sale) of ownership of public assets into private hands

Producers: Agents who use some technology to produce outputs, using inputs (will seek to maximise the net income from selling output, and so will be sensitive to the input costs and selling prices)

Public goods: These are goods for which exclusion (excluding users) is not feasible or is too costly, and which also show non-rivalry, i.e. the consumption of one unit of the good does not

affect the possibility of other user's consumption of the same good. Typical public goods are public light, fresh air, sun, beaches, defence and landscapes.

Public–Private Partnerships (PPPs) may be defined as cooperative ventures between a public entity and a private party, aiming to realise common projects in which they share risks, costs, and profit.

Recurrent costs: The continuous expenses involved in operating all parts of the water sector, including wages and salaries, fuel, electricity, chemicals, spare parts and minor capital items necessary to maintain and repair systems

Securitisation: A specialised financing institution can securitise any cashflow from loans provided for a pool of successfully operating infrastructure projects.

Service contracts refer to arrangements whereby a public authority remains responsible for operation and maintenance of the water supply system, but where specific activities are contracted out to private enterprises for a fee.

Shares are participations in the capital of an enterprise.

Social sustainability: A solution is socially acceptable in a given social and cultural context.

Stakeholder: The general term used to describe an agency, interest group, company, individuals, water users, bulk water suppliers and communities or representatives thereof, taking part in IWRM or in the related participatory process

Subsidiarity: The principle of subsidiarity implies that all planning, and decision making should be done at the most feasible level.

Sub-sovereign bodies: Layers of public administration and autonomous agencies below the level of central government (e.g. state and local governments, parastatal entities and utilities)

Supply: Aggregation of producers' supplies, which is sensitive to production technology, prices, input costs and other factors

Tariffs – Fees charged for water or sanitation service provision. Tariffs can be charged at the full cost of providing service (or higher, or lower), depending on the subsidy scheme.

Technical efficiency is traditionally related to production and it refers to firms getting a maximum output per unit of input, or use minimum input for a given target output.

Technology: The alternative technical combinations of inputs to produce some output

Total sustainability: The combination of economic, financial, social and environmental sustainability (requiring you to give a weight to the different components, however)

Travel cost method: A method to estimate the benefits of using sites (like parks) from visitors who could not demand more services according to entrance fees. The variation in the costs of travel for visitors is used to estimate the demand function for the corresponding service.

Venture capitalists are providers of capital who participate in risky enterprises, hoping to get a high return when the company is turned into a success and is then sold.

Water cycle: The link between the resource, its use for drinking water and the eventual reuse to allow it to flow back in the resource

Water markets: These can exist when water rights are tradable among users, both within and across sectors. A real water price may occur when demand and supply interact. These

markets are location specific and subject to transaction costs and externalities, so they generally face challenges to achieve efficient and equitable outcomes.

Water subsidies: Water subsidies are used to promote social equity, economic growth and employment, and to increase incomes among various water users.

Water tariffs: Water tariffs are broadly defined as all charges and levies imposed on the user of a service, if such charges bear some direct relation to the provision of the service.

Water taxes: Many public and private investment projects adversely affect water quality and degrade aquatic ecosystems, but many countries do not have standards to control water pollution or the capacity to enforce existing legislation. Some countries levy environmental taxes on wastewater effluent discharged directly into natural watercourses. This practice is based on the Polluter Pays principle.

Willingness to pay: How much consumers are willing to pay (in money) for getting benefits from a given good or service, is the basis for the demand curve and the estimation of aggregate benefits.

ACRONYMS

B-O-L	Build-Operate-Lease
B-O-O	Build-Operate-Own
B-O-T	Build-Operate-Transfer
CBO	Community Based Organisation
CVM	Contingent Valuation Methods
DM	Demand Management
EUWI-FWG	European Union Water Initiative-Finance Working Group
FRM	Flood Risk Management
GWA	Gender and Water Alliance
GWP	Global Water Partnership
IBT	Increased Block Tarrif
IWRM	Integrated Water Resources Management
KUIDFC	Karnataka Urban Infrastructure Development and Finance Corporation
MDGs	Millennium Development Goals
MVP	Marginal Valuation Product
NGO	Non Governmental Organisation
O&M	Operation and Maintenance
OBA	Output Based Aid
ODA	Official Development Assistance
OECD	Organisation of Economic Co-operation and Development
PLC	Public Limited Company
PPcP	Private Public community Partnership
PPP	Public-Private Partnership
PSI	Public Sector Involvement
PSIDC	Private Sector Infrastructure Development Company (Sri Lanka)
PSP	Private Sector Participation
ROT	Rehabilitate Operate Transfer
Rs	Rupees
SPV	Special Purpose Vehicle
UN	United Nations
USAID	United States Agency for International Development
WS&S	Water Supply and Sanitation
WASH	Water And Sanitation and Hygiene
WTP	Willingness To Pay

ABOUT THE AUTHORS

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Mrs. Deirdre Casella is a social demographer and coordinates IRC's -International Water and Sanitation Centre- thematic work on capacity development for strengthening local WASH governance. Other areas of focus in her work include peri-urban water and sanitation services, participatory monitoring and evaluation methods and finance for sustainable services.

Before IRC, she worked two years with the National Community Water and Sanitation Training Institute in South Africa, in particular supporting the development of a national training programme on gender and equity for local WASH governance in South Africa. With IRC, she has six years of experience with capacity development for supporting community based management of water supply and sanitation services and specifically gender- and poverty-sensitive participatory management tools and peri-urban water and sanitation services provision. Field experience within IRC includes assignments in Africa (South Africa, Uganda, Cape Verde), the Middle East (Egypt) and Asia (Sri Lanka and Viet Nam), including consultancy work for several international organisations and governments.

Mrs. Casella holds an MA in Development Studies specialized in population and development studies (The Hague, Netherlands) and was originally trained as a Sociologist (BA, University of California, USA and University of Hull, UK).

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Mrs. Catarina Fonseca is responsible for IRC's -International Water and Sanitation Centre- focus area Financing and Cost Recovery. As a senior economist she coordinates the theme supervising several activities such as action research, the production of publications on key issues and the development and facilitation of training courses together with partners in the South.

Before IRC she worked three years with a Portuguese NGO on participatory approaches with a gender and equity emphasis. With IRC, she has eight years of experience with community based management of water supply and sanitation services and specifically innovative finance, cost recovery mechanisms, tariff setting, microfinance and unit costs. Field experience within IRC includes assignments mainly in Africa (Mozambique, Burkina Faso, Cape Verde, Ethiopia) and consultancy work for several Foundations, international organisations and governments.

Mrs. Fonseca holds an MA in Development Studies specialized in agriculture and rural development (The Hague, Netherlands) and was originally trained as an Economist (MA, Lisbon, Portugal). She is currently working on her PhD (Cranfield, UK).

Kees Leendertse

Kees Leendertse holds an MA in social sciences from the University of Utrecht (the Netherlands). He specialised in rural and economic development issues, with special focus on aquatic resources. His work experience is in coastal zone and inland water bodies development planning and integrated management in assignments mainly in international organisations. His main focus has been on institutional organization of

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Michelle Mycoo

Michelle Mycoo holds a B.A. Geography and Social Sciences, a M.Sc. in Urban Planning and a PhD in water demand management with a focus on willingness to pay. She has been a full-time lecturer for ten years at the Department of Surveying and Land Information of the University of the West Indies, Faculty of Engineering St. Augustine, Trinidad. She lectures in several university programmes; the M.Sc. Planning and Development, M.Sc. in Civil and Environmental Engineering, M.Sc. Coastal Zone Engineering and Management, Graduate Diploma in Land Administration and the B.Sc. Surveying and Land Information.

Dr. Mycoo has published articles in water management in peer reviewed international journals. She has facilitated IWRM training workshops in IWRM in Trinidad, St. Lucia, Mexico and South Africa. In the Caribbean Water Network she is a member of the steering committee and is a trainer in the Caribbean Region. She has worked as a consultant to the World Bank, Department for International Development, U.K., the United Nations Educational, Scientific and Cultural Organisation, the United Nations Development Programme, the United Nations Economic Commission for Latin America and the Caribbean, the United States Agency for International Development, the Caribbean Development Bank.

Meine Pieter van Dijk

Meine Pieter van Dijk (PhD Economics Free University Amsterdam) is an economist and professor of Water Services Management at UNESCO-IHE Institute for Water Education in Delft and professor of Urban management in emerging economies at the Economic Faculty of the Erasmus University in Rotterdam (EUR), both in the Netherlands. Meine Pieter is member of the research school CERES. He worked on and in developing countries since 1973 and as a consultant for NGOs, the Asian Development Bank, the Inter-American Development Bank, the World Bank, different bilateral donors and UN agencies. His recent books are on Managing cities in developing countries, the theory and practice of urban management (2006, Cheltenham: Edgar Elgar) and with C. Sijbesma (eds., 2006): Water in India (New Delhi: Manohar).

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James Winpenny is an independent economic consultant, specializing in the international water sector. He is an economics graduate (BA, MA) from Cambridge University and has a masters degree (M.Phil) from the University of East Anglia. He has been Senior Economic Adviser at the UK's DFID, Economic Director of a management consultancy firm, Professorial Research Fellow at the Overseas Development Institute, and Senior Economist in the European Investment Bank. He

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Eduardo Zegarra

Eduardo Zegarra is Peruvian, 41, lives in Lima married to Liliana Herrera and with two children (10 and 7). Eduardo studied economics at the Catolica University in Peru and earned a PhD in agricultural and applied economics from the University of Wisconsin-Madison, USA, in 2002. His PhD dissertation was on the advantages and limitations of an agricultural water markets in northern Chile, in the Limarí Valley. He currently works as Senior Researcher at the Group for the Analysis of Development-GRADE, a think tank based in Lima, www.grade.org.pe .

Eduardo´s work in water issues has been focused on water tariffs systems, project evaluation, changes in water legislation and water markets. He teaches economics of water at PhD level at the Agricultural University La Molina in Perú, and also design and policy evaluation at masters' level at Catolica University. Among his IWRM related publications are a book "Water, Market and the State: an Economic and Institutional Approach", and an article "The market and water management reform in Perú" in Cepal Review Nº 83.

Damian Indij – Team leader

Damian holds a bachelor's degree in business administration and a master's degree in education with specialisation in educational management. He followed a postgraduate diploma course on management of non-profit organizations. He has extensive experience in teamwork development and alliance building initiatives as part of multidisciplinary and multisectoral task forces. A national of Argentina, Damián has worked at the national, regional in Latin America, and global levels, in public and UN agencies, networks, and international NGOs. He has participated as trainer and facilitator in several courses at national and international levels. He has accomplished activities in the fields of knowledge and network management, design and implementation of development programmes, strategic planning and institutional strengthening. He has been actively involved in the Cap-Net programme since 2002, and in the coordination of LA-WETnet, Latin American Water Education and Training Network, since the network formation, also in 2002.