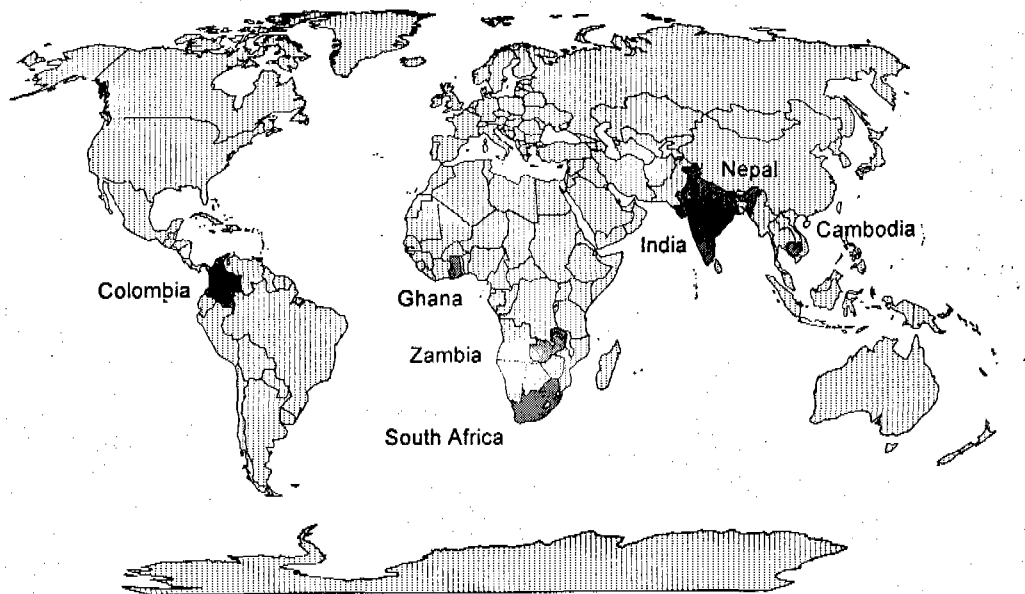


Project

'Promising Water Resources Management Approaches in the Drinking Water Supply and Sanitation Sector'



## Report on Assessments and Synthesis Workshop

- Assessments carried out during the first six months of 1997
- Synthesis Workshop at IRC, The Netherlands from 3 - 10 September 1997



IRC International Water and Sanitation Centre  
December 1997



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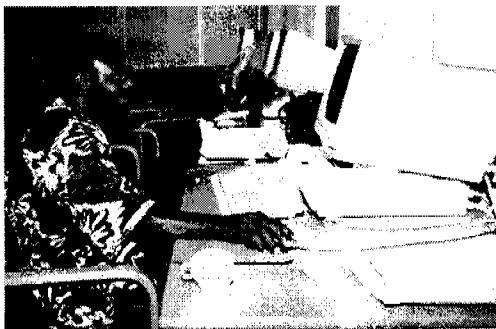
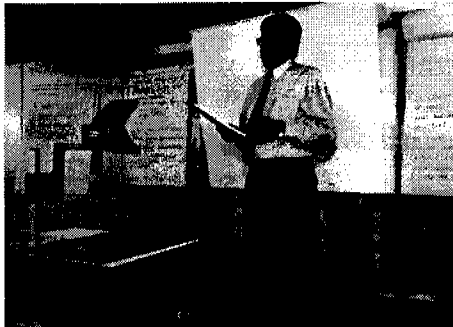
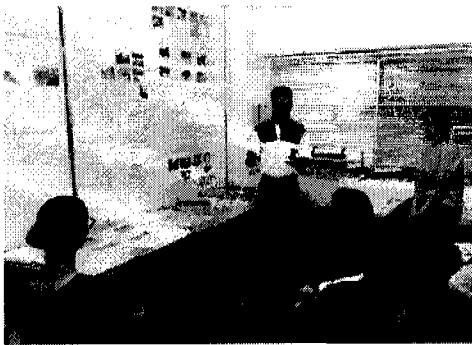
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Some impressions of the Synthesis Workshop held at IRC in September 1997



## Acknowledgements

This report is the second output of the project 'Promising Water Resources Management Approaches in the Drinking Water Supply and Sanitation Sector' in which the IRC International Water and Sanitation Centre together with 11 projects world-wide is exploring the extent to which good WRM principles are being put into practice. The report covers both the activities undertaken during the assessment of the case studies by the participating projects and the activities and outcomes of the Synthesis Workshop held at IRC in the Hague, The Netherlands from 3 to 10 September 1997.

The report is based on considerable work and enthusiastic inputs from all involved in this project. First and foremost we wish to mention the 13 participants that actually carried out the assessments in the field and through them the agencies and persons that were involved in documenting the case studies. By carrying out the assessments, documenting them, presenting and discussing outcomes at the Synthesis Workshop they provided the basis for the results documented here.

Throughout the project the participants and the IRC team benefited greatly from advice and inputs of Advisory Group members and colleagues at IRC.

Before, during and after the workshop logistics and communication were ensured by friendly and efficient inputs from the IRC support staff.

Compiling and condensing the sizeable amount of materials produced in documenting the case studies and during the synthesis workshop were carried out at IRC with great inputs by Elisabeth Lucas, a research associate, who participated in the workshop and worked temporarily at IRC for this purpose.

The project would not have materialised without the financial and moral support given to participants by funding and external support agencies in the field. The overall project was made possible with financial support of the Dutch Ministry of Foreign Affairs (DGIS), the Dutch Ministry of Housing, Spatial Planning and Environment (VROM), UNDP, the Swedish International Development Agency (SIDA) and the Swiss Development Cooperation (SDC).

While the content of the report is based on materials and reviews from all participants and an effort has been made to reflect all participants views, IRC takes responsibility of the final content.

We would like to thank all involved parties for their inputs and enthusiasm in carrying the project to a good end. We hope to have made a contribution to raising awareness and finding ways on how to narrow the gap between policy and practice in improved water resources management. The project will require follow-up as suggested in the last chapter of this report.

IRC, The Hague, November 1997



## *List of Abbreviations*

ATP	Ability to Pay
CARERE	Cambodia Area Rehabilitation and Regeneration
CINARA	Institute of Research and Development in Water Supply and Sanitation
DANIDA	Danish International Development Assistance
DFID	Department for International Development (formerly ODA)
DGIS	The Dutch Ministry of Foreign Affairs
D-WASHE	District Water, Sanitation Health Education
DWSS	Drinking Water Supply and Sanitation
FINNIDA	Finnish International Development Agency
IRC	International Water and Sanitation Centre
IWRM	Integrated Water Resources Management
M&E	Monitoring and Evaluation
NGO	Non-governmental Organisation
O&M	Operation and Maintenance
SEWA	Self-Employed Women's Association
UNDP	United Nations Development Programme
UNICEF	United Nations Children Fund
VDC	Village Development Committee
V-WASHE	Village Water, Sanitation and Health Education
VWC	Village Water Committee
WATSAN	Water and Sanitation
WTP	Willingness to Pay
WUC	Water User Committee
WRM	Water Resources Management

## Chapter 1. Introduction

This report is one of the outputs of the project 'Promising Approaches in Water Resources Management in the Drinking Water Supply and Sanitation Sector' coordinated by IRC International Water and Sanitation Centre and implemented together with 11 projects world wide with inputs from an international Advisory Group. The aim of the project is to document experiences with putting into practice principles for good water resources management as formulated at various international fora <sup>1</sup>.

This second report covers the documentation of case studies by participants during the period January - July 1997 and the presentation and analysis of outcomes at the Synthesis Workshop held in The Hague, The Netherlands from 3 to 10 September 1997 <sup>2,3</sup>.

The outcomes of this project will be publicized by IRC in an Occasional Paper. This paper will advocate for greater integration of WSS activities with more holistic management of water resources and also promote the adherence to good water resources management practices in water supply programmes.

While this report has been written so that it can be read as a stand alone document, a more comprehensive overview of the project approach and outcomes may be obtained by also reading the project document, the preparatory workshop report, the forthcoming occasional paper and the individual case study reports. Copies of these can be obtained through IRC.

**Chapter 2** provides a brief background of the project including an overview of the projects participating in this exercise and the case studies documented. **Chapter 3** deals with the Synthesis Workshop objectives and analysis approach followed. In **Chapter 4** the 8 principles considered are outlined and outcomes of the assessments in terms of strengths and weaknesses with respect to adherence to good water resources management principles are given. Also a reflection is made on the importance and interlinkages of the principles and the extent to which they are being adhered to in the cases documented. **Chapter 5** provides recommendations distilled from the case study reports and discussions and analysis at the Synthesis Workshop. Recommendations are formulated on how to promote and implement good water resources management practices. Finally **Chapter 6** presents the evaluation of the project as a whole and of the Synthesis Workshop. **Chapter 7** provides an overview of agreed follow-up activities, both in terms of disseminating lessons learned from this project as well as putting into practice recommendations made. More detailed information on participating projects, contact addresses of all involved in this project, methodologies used during the assessments is given in the **annexes**.

A word of caution. The reader has to keep in mind that the outcomes of this project are obviously limited by the fact that analysis, outcomes and recommendations are based on only 11 case studies. Most of the case studies represent the state of affairs in typical Water Supply and Sanitation (WSS) programmes. However we feel we brought together a wide variety of type of projects from various parts of the world, working at different levels and set in different socio-economic, natural and cultural environments. Therefore we are confident that a fairly good insight is given in the degree of putting into practice Water Resources Management (WRM) principles and the constraints and requirements identified.

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<sup>1</sup> see report 1 for more detailed information on project objectives, approach and outcomes of the preparatory workshop held in November 1996).

<sup>2</sup> the case studies are documented in separate reports as listed in the bibliography. The reader is invited to contact IRC or the participating projects directly for more details).

<sup>3</sup> Conferences in Mar del Plata, 1977; New Delhi, 1990; Nordic Freshwater Initiative, Copenhagen, 1991; Dublin, 1992; UNCED / Agenda 21, Rio de Janeiro, 1992; Ministerial Conference, Noordwijk, 1994, OECD/DAC meeting, Paris, 1994).



## Chapter 2. Background

Since the early 1980s a lot has been done world wide on the improvement of drinking water supply facilities. Sanitation and health education have received increased attention. However, a growing world population, rapid urbanisation, increasing agricultural and industrial production, coupled with changes in weather and climate patterns have led to increased awareness that water is not an unlimited resource. We start to realise that we do not treat the resource water very carefully. Examples of inefficient water use (large scale irrigation; leakage in piped systems), wasteful water use (in irrigation; industry; household water use), pollution of ground and surface water (non point source pollution by fertiliser application; untreated industrial and sewage discharges), conflicts about water (tensions in Africa - Egypt versus Soudan - and the Middle East - Turkey versus Iran and Syria; competing claims on water for agriculture, industrial, hydropower and domestic use) abound. In the past WWS projects have given little if any attention to these kinds of problems. Many issues related to improved WRM need to be tackled urgently. Experiences in this field are still limited.

In response to these developments, IRC International Water and Sanitation Centre, together with United Nations Development Programme (UNDP), initiated the project 'Promising Water Resources Management Approaches in the Drinking Water Supply and Sanitation Sector'. This project set out to assess, document and disseminate project experiences putting into practice principles agreed in Dublin related to water resources management. The underlying aim of this project is to contribute to improve WRM practice. Participating projects come from different parts of the world. All have a focus on WSS but are working at various levels of intervention (national, regional, local).

The Preparatory Workshop of November 1996 developed the framework for the assessment and a participatory methodology; the framework was developed on the basis of eight key principles of WRM.

Principles that have been addressed <sup>4</sup>.

- P1: Water source and catchment conservation and protection are essential
- P2: Adequate water allocation needs to be agreed upon between stakeholders within a national framework
- P3: Efficient water use is essential and often an important water source
- P4: Management needs to be taken care of at the lowest appropriate levels
- P5: Involvement of all stakeholders is required
- P6: Striking a gender balance is needed as activities relate to different roles of men and women
- P7: Capacity building is the key to sustainability
- P8: Water should be treated as having an economic and social value

Following this workshop in-country participatory assessments of selected case studies were carried out over a period of 6 months. Case studies were drawn from different continents, with a common focus on WRM, but applied at various levels of intervention (national, catchment, district, local). These assessments were documented and reviewed by the Advisory Group and IRC.

In September 1997 all participants convened again to present the outcomes of the assessments. Analysis and synthesis brought to light strengths and weaknesses in putting into practice good WRM principles. Reflection served to review the relative importance of certain principles, interlinkages between principles and constraints in putting them into practice. The reflection allowed to derive conclusions as to the applicability of policy and the formulation of recommendations for good WRM in the sector and the broader context.

### 2.1. Participating Projects

As mentioned earlier the project is being carried out together with a number of organisations / projects world-wide. As can be seen from the overview below an effort has been made to include cases dealing with WRM issues at various levels (national, regional, local) and addressing issues going beyond drinking water supply,

<sup>4</sup> see the framework paper in annex 5 for a more detailed discussion of these principles and the guiding questions and indicators that served as a basis for the assessments of the case studies.

e.g. irrigation, inter-sectoral allocation, basin and catchment management. A summary of the projects can be found in annex 1, and further information regarding project participants in annex 4. For more detailed information regarding the projects, readers are directed to the individual case study reports listed in the bibliography (annex 6).

#### **Participating Projects Overview :**

- *Volta Rural Water Supply and Sanitation Project Volta Region, Ghana assisted by Danish International Development Assistance (DANIDA)*  
Improvement of DWSS through the provision of safe drinking water supply and sanitation (DWSS) involving local technologies, integrated with hygiene education and community management; targeting 50 percent of the rural communities in Volta region.
- *Northern Province Development Programme Kasama / Mbala Districts, Zambia assisted by Irish Aid*  
Provision of safe drinking water to targeted rural areas, and integration of line ministry resources and capacities for integrated WRM.
- *Support for Water, Sanitation and Hygiene Education Projects in Drought-Affected Areas Kalomo District, Southern Province, Zambia assisted by the United Nations Childrens Fund (UNICEF)*  
Drought mitigation and access to safe DWSS through construction of water points and sanitation structures.
- *Tonga Water Supply and Sanitation Project Mpumalanga Province, Mvula Trust, South Africa*  
Extension of DWSS to former rural homeland areas characterised by poor water supply infrastructure and unpredictable river flow, primarily through bulk reticulation.
- *Mgeni Catchment Management Plan, Umgeni Water, South Africa*  
Rural and peri-urban water supply and sanitation, primarily through bulk reticulation, emphasizing integrated WRM at the catchment level and involvement of key stakeholders.
- *Rural Water Supply and Sanitation Project Lumbini Zone, Nepal assisted by the Finnish International Development Agency (FINNIDA)*  
Rural water supply, sanitation, hygiene education and irrigation development, promoting local institutions for local management. Reflecting the established project, the assessment involved analysis of two areas with contrasting priorities of DWSS and irrigation.
- *Integrated Watershed Development Project, Bilaspur District, Madhya Pradesh, India*  
Water conservation, DWSS and economic improvement in a poverty-affected region, using local-level technologies and institutional management capacities.
- *Cambodia Water and Sanitation (WATSAN) Project, Ministry of Rural Development, Royal Government of Cambodia, assisted by Cambodia Area Rehabilitation and Regeneration (CARERE), and the United Nations Development Programme (UNDP)*  
Capacity-building of government institutions to decentralise service provision activities, including DWSS, to the village level. The assessment included an analysis of an urban waterworks to represent national-level policy initiatives.
- *Rural Water Supply and Sanitation Project Maharashtra, India assisted by the Department for International Development (DFID)*  
Rural DWSS and progressive decentralisation of management to district, block and village levels; the assessment included analysis of water supply to the dominant irrigation sector.
- *Community Drinking Water Treatment Project Tolima Department, Colombia assisted by the Institute of Research and Development in Water Supply and Sanitation (CINARA)*  
Post-volcanic disaster relief for provision of a sanitary infrastructure as well as capacity-building for management of the systems; the assessment focused on a demonstration project of drinking water treatment.
- *Rural Water Resource Management Gujarat State, India, assisted by the Self-employed Women's Association (SEWA) and the Dutch Ministry of Foreign Affairs (DGIS)*  
Economic and social improvement of poor rural communities, particularly women, by building DWSS management capacities at the community level.

### **3. Project methodology and Synthesis Workshop**

#### **3.1. The project concept and approach**

This project was developed following an inventory on the current policies and strategies of External Support Agencies with regard to WRM which IRC had produced in 1994 in response to a request from OECD/DAC<sup>5</sup>. The inventory gives an overview to what extent countries with ESA support put recommendations and principles for improved WRM into practice through concrete programmes and projects. The project identified a number of these promising programmes and projects, and proceeded to jointly assess with them the experiences made so far in putting policy into practice, and based on these assessments, contribute to further improving practices.

Specific project objectives included raising awareness of the need for improved WRM practices, sharing existing experiences and building capacity among participating projects in conducting participatory assessments involving stakeholders at relevant levels. IRC's primary role was to facilitate this exercise. Awareness raising, capacity building and promoting participatory approaches were ensured by involving national staff of participating projects from the start of the project in its design, planning and implementation. The project consisted of various phases. Initially a draft framework paper was prepared for discussion, focusing on the significance of water resources management and consolidating recommendations and principles as formulated at a key international conference was prepared. An advisory group consisting of specialists in this field and projects interested in carrying out an assessment of experiences, commented on the framework paper (see annex 5). A Preparatory Workshop was held in November 1996 at IRC, during which participants reviewed and adopted the framework paper, also developing guiding questions and indicators to be used in the assessments. At this workshop participatory assessment methods and tools were identified and practised and a participatory assessment methodology was jointly developed. Following the workshop participants returned to their countries and involved key stakeholders in carrying out a participatory assessment of experiences in their countries and project areas. Throughout the assessments participants received advice and support from members of the advisory group and IRC where required. Draft assessment reports were reviewed by the advisory group and IRC staff.

#### **3.2. Workshop outline**

The aim of the Synthesis Workshop, held in The Hague from 3 to 10 September 1997, was to firstly present the outcomes of the participatory assessments. Secondly to synthesize outcomes in terms of experiences both with respect to the relevance of WRM principles to project situations and activities and formulate recommendations on how to improve field practices.

#### **3.3. Workshop objectives**

More specifically the workshop allowed opportunities to:

- Present the outcomes of the case studies;
- Compare and synthesise outcomes in terms of weaknesses and strengths of putting into practice WRM principles;
- To reflect on the importance of principles and their interlinkages;
- To reflect on the participatory assessment approach followed;
- To formulate recommendations for improved WRM practices;
- To explore possible follow-up activities in terms of dissemination of lessons learned and further learning.

#### **3.4. Workshop setup and methodology**

The approach of the Synthesis Workshop promoted the participatory sharing of experiences. This was aided by visualising information as much as possible (e.g. posters of case studies, utilisation of cards and flipcharts) and by promoting active involvement of all participants in conducting workshop sessions (e.g. working in smaller work groups) and documenting its outcomes.

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<sup>5</sup> *Towards Better Water Resources Management: a catalogue of policies and strategies of external support agencies*, Visscher, J.T., Sörensson, M.S., The Hague, 1994

The workshop was facilitated by advisory group members and IRC staff (see annex 4) stimulating presentations, discussion, diagnosis, analysis and reflection by all. The members of the Advisory Group were present during the most of the workshop and especially provided inputs and support during the analysis of experiences and the reflection on adherence to principles.

### **3.5. Workshop programme**

In total the workshop covered 6 working days from 3 to 10 September 1997. The workshop programme can be found in annex 2. The first two days participants prepared and visited an exhibition of posters illustrating the case studies assessed, highlighting the outcomes. The following three days small working groups analysed all case studies principle by principle in terms of the extent to which principles are being put into practice. Based on this analysis strengths and weaknesses were identified and recommendations for improved WRM practices formulated. Group work was presented in plenary sessions and small groups then synthesised outcomes per principle. One day was spend on a reflection on the principles and the assessment outcomes and methodologies followed during the whole project. The importance of the individual principles but also interlinkages between them were discussed. Recommendations were made on the usefulness of using participatory methods in improving WRM practices.

The last to 2 days were used to identify follow-up activities and to present the outcomes of the joint project. Follow-up activities both for dissemination of project outcomes and for further experimenting and learning were identified. At the end of the programme both the workshop and the overall project were evaluated and participants received a Certificate of Attendance. Finally a presentation on the workshop outcomes was given to IRC staff and some invited guests.

## 4. Assessment Results

### 4.1. Introduction

A set of *assessment results* were developed, drawing on the synthesis workshop and country case study reports. The strengths, relevance to the principles and linkages between them varied by principle and according to the context of drinking water supply and sanitation (DWSS) or water resources management (WRM).

Following are the *findings* for each principle, presented in terms of strengths and weaknesses. They are listed according to levels of intervention, from national government through to local level. Each section is highlighted by case study illustrations; they close with a *reflection* on how well the case studies adhered to each principle and on the linkages between principles. Out of the eleven case studies, only two related specifically to WRM at the catchment level (South Africa, Mgeni Catchment; Bilaspur, Madhya Pradesh, India); the others cases are principally concerned with community DWSS.

### 4.2. Principles strengths, weaknesses and reflection

#### Principle 1: Water source and catchment conservation and protection are essential

DWSS is set within the context of competing activities within a catchment or sub-catchment. Key issues at this level are inefficient water use, pollution from point and non-point sources, nutrient loading and soil erosion. The outcomes for DWSS are often severe, with disease from contaminated sources and inadequate supplies of drinking water. Broader effects can be seen in terms of declining water tables, salinisation and degradation of water courses through urbanisation, deforestation and other land uses. WRM refers to an integrated approach that coordinates these competing demands, at appropriate catchment or sub-catchment levels.

#### STRENGTHS

- Policy directives and guidelines provide a framework for WRM  
**India** Under the Rajiv Gandhi Watershed Mission Guidelines communities contribute to a *Watershed Development Fund* to gain project approval. **Cambodia** the Ministry of the Environment is developing *guidelines for water quality and solid waste disposal*. **Colombia** a National Environment System requires that 1% of DWSS project funds is ear-marked for *catchment protection*; this is raised to 3% for irrigation projects, in addition to a minimum 30 metre protective buffer required along riparian areas and 100 meters around water sources.
- Regional institutions are developing catchment monitoring programmes  
**South Africa** The *Mgeni Catchment Management Plan* guides water quality and quantity analyses by Umgeni Water; this forms the basis of Umgeni projects such as the 'Working for Water' campaign to restore river courses, catchment water yields and water quality. **Colombia** with the support of CINARA, Tolima Health Service is initiating a programme 'Surveillance and Control of Water Supply Systems' through *training workshops in sanitation* and water quality and quantity *monitoring*. **Ghana** The *Water Resources Research Institute* carries out project monitoring at the *regional level*. At the district level, a *District Planning and Coordinating Unit* plans and evaluates water supply projects for possible adverse effects on water quality and quantity, assisted by District Water and Sanitation Teams (DWST).
- Local-scale initiatives are guided by project implementing agencies  
**Ghana** public-private agency partnerships are guiding *WATSAN committees* in developing mitigation activities and by-laws, e.g., enforcement of minimum distances between sanitary installations, waste dumps and waterpoints to prevent pollution of boreholes and hand-dug wells project fieldstaff and WATSAN committees. **Nepal** In Banganga under a Memorandum of Understanding (MOU) between irrigation committee (Kulapani Samitee) and District Development Committee, dredging activities in river beds are banned 100 metres both up- and downstream of water intake points. **Zambia** in Kalomo District

villagers have applied protective measures such as fencing around water sources and gravel packing and grouting between pipes and borehole walls. **India** In Madhya Pradesh conservation measures such as contour bunding and trenches, gully plugging and afforestation are guided by *Village Watershed Committees*. In Gujarat state, bunding diverts wastewater and excess irrigation water that can be used to recharge groundwater levels.

• *Protection and conservation may be inherent in local customs and traditions*

**Ghana** In Nyagbo Emli Israel, Hohoe district, the WATSAN committee enforces *traditional laws* that render the catchment sacred, forbidding farming, waste disposal and other activities. **Zambia** (Northern Province) some traditional leaders (chiefs or village headmen) enforce customary laws and witchcraft to avoid deforestation along watercourse.

## WEAKNESSES

• *A clear WRM policy framework is often lacking*

Integrated management concerns not only extraction of a water resource but indirect uses, such as waste water disposal. **South Africa** In Mgeni Catchment industries pay for water supply but not for *discharge* into a water body; similarly, household consumers do not cover the costs of *waste disposal*.

• *Where legislation exists, it is often poorly implemented*

**Cambodia** logging bans are ineffective in the Sangke catchment due to inadequate *enforcement* by government. **South Africa** In Mgeni Catchment *legal procedures* against industrial polluters are costly and drawn-out, and fines are often unrepresentative of damage caused. **Ghana** without *formal endorsement* by District Assemblies, the authority of WATSANs to implement *local by-laws* and charge defaulters on water tariffs is undermined.

• *Departmental directives are often conflicting*

**Zambia** (Northern Province) conflicting messages arise where the Agriculture Department encourages uprooting of trees for better farming, and planting of orange trees thought to protect the water source and catchment. The Forestry Department encourages the same communities from cutting trees but to plant more.

• *Negative practices within a catchment are complex*

**India** In Maharashtra state it is difficult to trace polluters in cases of *non-point source pollution*, such as agricultural pollution from over-application of fertilisers; also the *cumulative effects* of un-regulated *private extraction* of groundwater are difficult to measure and foresee.

• *Cost-benefit analyses in water supply project appraisal are guided by volume of water harvested*

**India** In Maharashtra the Irrigation Department controls the majority of dam construction projects; project appraisal is guided by a feasibility criterion that requires water harvest benefits to be equivalent to an area four times that submerged. This emphasis on water harvest benefits may give less weight to the costs of such a project in terms of values and services of water that will be lost, such as wetland functions.

• *There is a lack of capacity for local level monitoring and enforcement*

**Colombia** In Tolima Department, CORTOLIMA's monitoring programme is *ad hoc* with visits made upon request by villagers, rather than as part of a *systematic monitoring* system; this is attributed to a lack of technicians and financial resources. **Zambia** (Northern Province) There is no legal framework to back traditional leaders in enforcement of punitive measures for deforestation activities; the new Land Bill in effect weakens the chief's management powers.

## REFLECTION

Awareness of the scarcity of water resources is growing rapidly, reflected in the review or development of watershed guidelines; regional monitoring programmes; and traditional / local initiatives such as bunding and positioning of wells. However, the extent to which these local measures are ad hoc or consistent is unknown. At the national level it is clear that WRM is typically carried out on an ad hoc basis, with severe limitations of

centralised monitoring of pollution and waste disposal, and conflicting departmental objectives. At lower levels formal endorsement of WRM institutions is a major weakness, particularly at the local level.

**Principle 2: Adequate water allocation needs to be agreed upon between stakeholders within a national framework**

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As water scarcity increases and new sources of supply become more costly to exploit, WRM institutions at various levels are beginning to coordinate competing user demands through forums. The limitations of current allocation systems are being acknowledged such as riparian rights<sup>6</sup> and priorities increasingly assigned to social and environmental needs. Signs of decentralisation in WRM are enabling stakeholders to coordinate their demands within the constraints of catchment water quality and quantity capacities. Informal community allocation mechanisms are being seen as having an important role in this process, able to adapt to changing demand and supply situations with relative ease.

**STRENGTHS**

**Water allocation is guided by national and state level directives**

**South Africa** Allocation of water in the Mgeni Catchment is regulated by the central government DWAF. Access to water rights is under review; a *revision of the Water law* may replace riparian rights with basic social and environmental rights to water. **India** In Gujarat and Maharashtra states, DWS has been prioritised in national legislation; in Gujarat state, up to 40% of dam water can be used for drinking water purposes.

**WRM institutions provide a forum for allocation at the catchment level**

With access to catchment-level data on minimum flow levels, WRM institutions are able to determine the level of water rights available within a catchment. **South Africa** The most formalised system of stakeholder consultation in South Africa is in the forestry sector via a *Forestry Review Panel*, since this sector has far-reaching effects on catchment water quality and quantity.

**Allocation of water rights through community participation**

*Tolima Department*

**Colombia** In San Felipe, water rights are based on *minimum catchment flow* data. When the data is available it is announced in the Town Hall. CORTOLIMA coordinates requests made for water rights, allowing one month to enable parties claiming the same right to come forward. Requests for connection to the water supply are made to an Administrative Committee; for instance, a petition for connection of a housing estate has been denied due to a lack of supplies. A chicken farm near San Felipe has also had rights denied to use water for industrial purposes, since the Committee has not yet established industrial tariffs.

**Local allocation mechanisms guide allocations within sectors**

Local allocation systems to prioritise water distribution may provide a simple alternative to formal allocation methods, since they are flexible to changing local needs and supply conditions.

**Village-level water allocation**

*Lumbini Zone and Gujarat State*

**Nepal** In Kapilvastu district, Lumbini Zone, the Kulai Samitee devise *rules* for irrigation water allocation, whereas Water User Committees (WUC) manage community and private wells for groundwater drinking water supply. The Village Development Committee (VDC) consults both sectors over allocation, overseen by the District Development Committee. Irrigation water allocation is based on a traditional system of land size *Bighatti Kulai*: daily water is available for more than 2 hectare plots; access on alternate days for 1-2

<sup>6</sup> *Riparian rights* refers to the assignment of water rights based on land-ownership adjacent to a water body

hectares); and access every third day (for up to .5 hectares). Local scales are installed at the branching points of canals to distribute water evenly and Badghars (watchmen) monitor users.

**India** The Datrana Pond project, Gujarat state, aims to supplement piped drinking water with pond water. The pond was sited to ensure *equal access* and proximity to the village. Every member of the village uses the pond water - small, medium and large farmers, the village school and even neighbouring villages. Distribution is flexible to meet changing demands, rather than calculated per head, per day. Allocation issues are discussed in village meetings *gram sabhas*.

## WEAKNESSES

### Where they exist, catchment-level forums may lack true user representation

**South Africa** Powerful interest groups represented on Umgeni Water Board, such as the Forestry Department, tend to influence allocation decisions. Individual domestic users particularly in rural residential areas, feel excluded from the decision-making process.

### Water allocation Maharashtra state

**India** In Maharashtra state, Irrigation Departments control dam project appraisal and allocation of permits for Lift Irrigation Schemes. Consultation with interested parties often occurs after projects are implemented. In addition, there is no *forum* for allocation of lift scheme permits, so that lifting often exceeds permit allowances. A dichotomy results, with villages that may lack adequate drinking water, but in which water-intensive crops such as sugarcane are cultivated.

### Local government allocations are inadequate and may be influenced by political objectives

**Zambia** (Northern Province) allocation of drinking water supply by Mbala Municipal Council is perceived as inadequate by stakeholders due to the lack of *consultation* through a formal forum.

### Conflicts in allocation occur at the DWSS project level

**Ghana** Overflow from two village reservoirs can not be used in an adjacent community because it is located outside the DWSS project area. **Cambodia; India** (Gujarat), drinking water pipeline schemes do not reach communities at the end of distribution lines, and the *allocation system* per head per day, is often inadequate for fluctuations in villager water needs.

## REFLECTION

National priorities are being redefined to account for pressing interests under conditions of water scarcity, such as minimum catchment flow levels and essential drinking water supply. At the catchment level, forums are being created in some contexts although this tends to be the exception rather than the rule. In the case of Colombia a democratic process of public requests for water rights can be seen. Implicit in this principle is the *decentralisation* process in WRM (principle 4) that can guide the process of consultation at the catchment level. In other cases true representation by interested parties is often lacking in the consultation process as chief custodians of large-scale water systems pursue their own agendas (India, Maharashtra). Local-level systems are often effective in guiding allocation according to traditional rules, local knowledge of needs and physical water supply conditions and coordination through local forums.

### Principle 3: Efficient water use is essential and often an important water source

Efficiency in water use is being recognised as a priority with conditions of increasing water scarcity. Measures are being directed at efficient allocation between uses through conservation measures during the various stages of conveyance, storage and use. At the project level measures can be made regarding technical design, construction, O&M and water use practices. At the catchment level this principle is closely tied to



efficient allocation of water between sectors, such as the reuse of DWSS in irrigation. A central component of increasing water use efficiency is effective tariff policies that recognise the economic value of water (see principle 8).

## STRENGTHS

- There is an awareness of the need for water use efficiency  
**South Africa** Umgeni Water Board is overseeing a project that fits *water conservation devices* such as meters and monitors plumbing leakages. **Cambodia** Battambang Town, urban sewage undergoes *treatment and reuse* in the irrigation of local vegetable crops. Inspection units regulate water use by monitoring water meters and enforcing a system of fines and warnings to users.

### Adoption of efficiency measures

### San Felipe

**Colombia** (1991) Water demand in San Felipe exceeded the local treatment plant capacity. Inspection of the distribution network showed that over 90% of users had *leakages* in taps, pipes and sanitation facilities. In partnership with Tolima Health Service for technical guidance, the community set a schedule for *O&M* and installation of *water meters*. Water meters showed household consumption continuing to rise. Consulting with the community, the Water Committee set a *tariff* for basic supply, rising incrementally as supply increased. Following the tariff policy, 90% of users reduced their water demand.

- Water conservation measures exist in rural areas  
**India** In Maharashtra, measures include training cultivators in the use of *drip and sprinkler irrigation* systems; VWCs earmark lower-quality sources for cattle watering; and push-up taps are being featured in new project designs. In Gujarat state, *water reuse* is common. Village Panchayats often auction excess drinking water and reuse cooking water in irrigation. **Zambia** (Southern Province) VWCs and users meet to collectively identify inefficient practices. Measures such as queuing are common-place in times of drought and respected by villagers.

## WEAKNESSES

- Efficiency objectives within the policy framework are lacking (see principle 2)
- Inefficient water use practices are still common in rural areas  
**Nepal** Gulmi district experiences high water losses, in spite of local rules such as fines for misuse. Losses relate to *water conveyance* (seepage from canals) and *water use* (open taps of public standpipes, pipe cutting). **Nepal; India**, *traditional farming practices* such as field flooding, and cultivation of water-demanding crops such as rice are root causes of inefficiency.
- Technical designs are poorly-adapted to local conditions  
**Zambia** (Southern Province) *imported pumps* and related components were unsuited to suit local conditions.
- A national DWSS tariff policy is lacking for effective demand management (see principle 8)

## REFLECTION

Progress is being seen in improving efficiency with respect to water supply urban areas and the introduction of metering related to precise volumetric measures of use, and O&M of conveyance systems. Similarly, in local contexts there is widespread application of community regulation in times of scarcity through queuing, water reuse and prioritising water use according to quality. A policy framework guiding efficiency measures is often lacking that will be crucial to address entrenched systems of inefficient water use such as flooding for rice cultivation. These issues can only be altered with financial support and a transfer of technical knowledge to the local level under capacity-building initiatives. Similarly, capacity is lacking in the project planning cycle

to ensure that technologies are selected that correspond with project conditions, and that tariff strategies are adopted that encourage efficient water use in rural areas as well as urban.

**Principle 4: Management needs to be taken care of at the lowest appropriate levels**

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In most countries decentralisation in the DWSS sector has been going on for some years. Its main purpose has been to improve service delivery through user participation for increased cost recovery and improved sustainability of systems. In the WRM field, a centralised system of management is proving inadequate to address water resource issues, since often more detailed knowledge of water quantity and quality conditions is required. Based on experiences in the DWSS sector similar trends to decentralise WRM are being seen. Whereas decentralisation in the DWSS sector is typically along administrative lines (e.g. from national government to local government and communities), WRM needs to be organised along river basin, catchment and sub-catchment lines. Local management combined with *community participation* is being seen as a positive trend but requires awareness-raising and capacity-building between all levels of management.

**STRENGTHS**

***Decentralisation is occurring in DWSS and WRM, with specific roles assigned to various levels (see principle 1)***

In terms of WRM, roles are being assigned to various levels : policy directives at the national level; monitoring programmes at the regional level; forums for consultation at multiple levels; and local / traditional initiatives (see examples outlined under principle 1). There is also a clear link in some cases between national and local levels e.g., **India**, Watershed Development Fund; **Colombia**, National Environment System (principle 1).

Similarly, in DWSS, specific management roles are being assigned to various levels. **Ghana** at the district level a *District Planning Coordinating Unit* (DPCU) has the mandate to plan, monitor and evaluate the implications of water development programmes in the Volta Region. The DPCU coordinates supply with the assistance of *Drinking Water and Sanitation Teams* (DWST) and Environmental Health Assistants to link up with communities; developments with the potential to adversely affect water quality and quantity are reported to DWSTs. DWSTs are equipped with skills in community development, hygiene education, sanitation and water supply, to assist village Water and Sanitation (WATSAN) Committees in the take-over of DWSS projects. **India** In Maharashtra three institutional levels are responsible for the management of specific water sources : Zilla Parishad at the district level (percolation tanks); Panchayat Samiti at the block level (rivers) and Gram Panchayats at the village level (ponds / lakes and groundwater sources).

***Decentralised management of DWSS South Africa***

**South Africa**, the Department of Water Affairs and Forestry (DWAF) establishes *national policy guidelines* and a national water development strategy. It also sets a *minimum service standard and monitors and regulates actual service provision*. Provincial Water Committees coordinate development planning and liaise between the region and other provinces; they also identify priorities and critical areas. In urban areas, responsibility for water utilities lies with urban local authorities. The Water and Sanitation departments manage secondary storage, transmission and sewer reticulation serving townships, suburbs or rural areas. In rural areas water boards or regional councils serve this function.

In rural areas responsibilities for O&M of reticulated infrastructure are being passed over to *local Water Committees*, a requirement of the government's Reconstruction and Development Programme. In Mgeni Catchment a regional water board, Umgeni Water, is responsible for storage and bulk water supply to urban local authorities and rural settlements. The emphasis of the company's business is shifting from bulk supplier to direct supply to the end user. The agency is implementing its Rural Areas Water and Sanitation Plan (RAWSP), based on the national directives. Its Rural Planning Officers are tasked with visiting rural areas to gain commitment from the people and guide the establishment of the local Water

Committees for eventual management of water and sanitation infrastructure. Regional water boards offer *technical guidance* in issues such as labour disputes, water connections, meter reading and accounts management. Water boards are also required for *financial support* or to initiate financing schemes.

Benefits can be derived from community-level management in DWSS and WRM

Community management may improve the sustainability of DWSS and WRM functions and develop a community's ability to organise and manage its own development priorities, a 'demand-driven' approach. **India** SEWA's work in Banaskantha builds local capacities to establish independent, formally-recognised local leaders and eventually take over projects. Female *village leaders*, *agevans* liaise with villagers and higher levels. Villagers report confide in the local leaders in *gram sabhas* to air grievances; the leaders are valued over external managers for their familiarity with villagers and their problems and proximity to the village, enabling daily monitoring of water resources.

Local level management of DWSS Kalomo District

**Zambia** The National Water Policy promotes community involvement in DWSS through a *tiered system*. In Kalomo District (Southern Province) communities form a Village Water, Sanitation and Health Education committee (V-WASHE) and apply to the District Water, Sanitation and Health Education committee (D-WASHE) for a *waterpoint*. The V-WASHE has several *obligations* : to raise 25% capital investment; decide on site selection; and organise pre-project assignments such as site clearing and collection of local raw materials. Once the project is operational, village communities are involved in *day-to-day O&M and user fee collection*. More *technical aspects* of project management are increasingly being decentralised to private contractors e.g., pump mending, spare-parts supply and private siting and drilling contractors.

See Principle 1 for WRM initiatives at the local level : , India, Madhya Pradesh, *Village Watershed Committees*; Ghana, Volta Region, *WATSAN Committees*.

There is a strong role for traditional DWSS / WRM management measures

**Nepal** Kulai Samitee (irrigation committee) members in Gulmi District have been managing intake sites and canals for 70 years. *Sub-committees* led by a *Badghar* (leader) assist the irrigation committees, by explaining management decisions to villagers, managing financing, and regulating water use efficiency according to local rules. *Badghars* must be present in Kulai Samitee meetings, or face a fine and can not argue decisions made in committee meetings. Water User Committees regulate illegal connection of pipes and have developed a fine system for misuse of water.

(See Ghana Principle 1, for traditional WRM measures at the local level)

## WEAKNESSES

The district level lacks management capacity in DWSS

**India** In Maharashtra State Zilla Parishads often lack the necessary technical skills and resources for *complex regional schemes*, requiring support from higher levels. **South Africa** In rural areas water boards or regional councils manage secondary storage, transmission and sewer reticulation. However, regional councils usually focus on a single activity such as drinking water supply, sewerage or drainage, with the inherent weaknesses of low management capabilities and linkages with local government; in many rural areas sanitation is lacking completely. **Zambia** (Northern Province) district bodies often do not enable user representation e.g., water allocation by Mbala Municipal Council is perceived as inadequate by stakeholders due to the lack of a forum for consultation.

The local level lacks management capacity in DWSS

**Ghana** WATSAN committees in Volta Region have no *legal status* and can implement by-laws only if they become a sub-committee of Unit Committees (these have legal backing). This has caused conflict between the two committees and duplication of some functions. Internal problems also dog progress by WATSANs, such as low *transparency* in accounting procedures and lack of *cooperation* with traditional leaders. **South Africa** for reasons including socio-political history, local structures are often weak, lacking

capacity in technical, financial and management skills. The complexity of the bulk transmission system is also a challenge to local level management in this country. **Nepal** Gulmi District, Water User Committees need to be registered and given more authority to regulate illegal connection of pipes and implement the fine system for misuse of water.

Local inertia exists in management of state-funded projects

A basic requirement for decentralised management is community interest and initiative; publicly-financed projects may lack this. **Cambodia** assigning responsibilities for O&M of public waterpoints has been difficult since locals feel government is responsible for state-funded facilities.

## REFLECTION

In terms of WRM, roles are being assigned to various levels : policy directives at the national level; monitoring programmes at the regional level; forums for consultation at multiple levels; and local / traditional initiatives (see principle 1). However this process is in its early stages and often on an ad hoc basis only. In the DWSS sector the decentralisation process is more well-established and clearly seen in the WASHE concept, Zambia and District-WATSAN linkages in Ghana. Traditional local management systems are also an important feature of some countries such as the Kulai Samitee system in Nepal. In general, the *institutional capacity* for DWSS and WRM seems weak. This is reflected in ad hoc directives from the national level; the lack of forums at the regional level and guidance / facilitation to lower levels; and lack of clear mandates and resource allocations to local management institutions.

### Principle 5: Involvement of all stakeholders is required

Integrated WRM implies involvement of all users. Stakeholder forums at multiple levels can encourage communication among interested parties. With regard to WRM or large-scale water supply projects, forums involve multiple user groups within a catchment, each with their stake in the water resource. These various uses may be any one of : direct use, indirect use or existence value<sup>7</sup>. With respect to local DWSS projects, local forums encourage dialogue among various drinking water users, and include actors using the water for other purposes (e.g. livestock, household vegetable plots, building) as well as local services dealing with health and environmental sanitation.

## STRENGTHS

Stakeholder forums exist within water supply institutions (see principles 2 and 4)

**South Africa** Major bulk storage and distribution projects managed by Umgeni Water involve a *Steering Committee* that allows stakeholders to liaise with the project developer. Meanwhile, at the local level a *Water Committee* is the forum for community water supply projects. A *Forestry Review Panel* serves this purpose for commercial forestry projects, perceived as having the most widespread effect on catchment water supply; discussions include government departments, forest and timber companies and research institutions in the consultation process.

Institutions coordinate stakeholder consultation at multiple levels

**India** in accordance with the national Watershed Guidelines stakeholders such as the Gram Panchayat and women's groups, are represented on *Watershed Committees*.

*Stakeholder forums at multiple levels* Volta Region

**Ghana** The national *Water Resources Commission* has a mandate to regulate and manage water resources and coordinate policy. Stakeholders such as potable water supply and irrigation agencies, the

<sup>7</sup> *Direct use* refers to direct extraction of a resource e.g., water supply, irrigation; *indirect use* to other uses that indirectly use water, e.g., forestry; and *existence value* to the value inherent in the knowledge that a resource is being safeguarded (for instance an endangered species).

Water Resources Research Institute, Environmental Protection Agency and Forestry Commission are represented through membership of the Commission.

Under the Local Government Act of 1993, the *District Planning Coordinating Unit* initiates public discussion on policy proposals for district-wide and sub-district development plans, local action plans and settlement plans. The *District Management Committee* represents women's groups, WATSANs, training institutions such as the School of Hygiene as well as other interested groups. At the project level, a Dam Management Committee for Tedeapenu dam provides a forum for stakeholders; the Committee advises on the use of the dam, its reservoir and catchment areas (see also principle 2).

- Community management in DWSS is evolving (see principle 4)

#### WEAKNESSES

- Regional forums in WRM are guided by politics

**South Africa** In Mgeni Catchment powerful stakeholders are well-represented on water boards, whereas domestic users and conservation interests are unable to make their views heard on allocation, pricing and environmental management issues.

Water courts are limited in resolving stakeholder conflict

**South Africa** The water court is the last resort for conflict resolution, but it has no *legal mandate* to hold responsible parties liable for their actions. In addition, court decisions are not open for public scrutiny.

- Local forums for DWSS lack the financial resources to make them operational

**Zambia** (Northern Province) committees exist at the village, district and provincial levels but lack the commitment by members due to a lack of *budgetary allocations* : district level WASHes exist on paper only, because staff lack the resources to attend village meetings.

#### REFLECTION

Stakeholder forums are limited in WRM and tend to relate to the national level (Ghana) or catchment level (Mgeni, South Africa). Even at the catchment level forum creation is in its early stages with the problems of coordination of multiple competing users. In Ghana recent progress has been made through involvement of interested parties in DWSS between district and local WATSAN levels. This follows the progress in *decentralisation* along administrative lines, and the greater ease in communication at increasingly lower levels. In most countries greater resource allocations directed at dialogue and formal recognition of forums would enhance progress (see principle 7).

*Principle 6: Striking a gender balance is needed as activities relate to the different roles of men and women*

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Women have traditionally been responsible for managing local water resources and are therefore particularly affected by DWSS issues. As well as their special position in terms of knowledge of local water quality, quantity and health issues and their responsibilities in local WRM, women differ in their needs. In spite of these facts, DWSS project management has down-played the importance of women, from project design considerations through to management and decision-making by women. This is largely a function of more general inequalities regarding women in society. With due recognition of the vital role for women in DWSS, and WRM, a new approach seeks a balance in the contribution to DWSS by both genders, that accounts for their differences in both needs and in roles.

#### STRENGTHS

- Strong national and regional policy exist regarding gender

**India** national watershed guidelines require a minimum 30% reservation for women in Watershed Committees and Panchayat bodies. In Gujarat State, a Socio-Economic Unit (formed under the Water Supply and Sewerage Board) addresses *socio-economic* and *health* aspects of water scarcity, through partnerships with NGOs such as SEWA.

Sensitisation efforts aim to create an enabling environment for women in DWSS

**India** In Maharashtra gender sensitisation *workshops* are held at state, district and block levels. At the local level, Village Water Committees are creating a more supportive environment for women by rescheduling pilot sanitation projects to ensure women can attend, and selecting 'gender neutral' venues for meetings, such as the local temple rather than male-dominated Panchayat office.

*Encouraging involvement by women* Gujarat State

SEWA aims to increase the *confidence* of women to participate in an organised and productive way through :

- *training* in basic project technologies used and the government system;
- *sensitisation to change traditional gender roles in a sensitive way* : SEWA opens activities to men and women. After the initial unease, men tend to support women because of the additional income they generate. SEWA tries to ensure this is managed by women;
- *organising local management* (see principle 4); and
- *forums* gram sabhas give villagers an opportunity to ensure a project design meets local needs. SEWA tries to ensure that women speak out, even in front of their husbands and village leaders.

Gender issues are an integral component of training programmes

**Ghana** In Volta region, women are involved in technical and decision-making positions through membership of WATSAN committees. Men are also involved in activities perceived as the domain of women, such as water fetching and hygiene education.

The particular strengths of women are being recognised in the project planning cycle:

The traditional link between women and DWSS may provide a sound basis for management and decision-making roles. **South Africa** In Mgeni Catchment, female water committee members often resolve disputes over water delivery more rapidly than their male counterparts, since they recognise the benefits to women of time and energy available for other activities. Women user groups are consulted for their *traditional knowledge* of instream flow requirements, during the planning phase of dam projects.

## WEAKNESSES

The gender balance approach conflicts with traditional beliefs

**India** In Maharashtra there is *resistance* to women appointed as 'Village Water Person', since this position is coveted by men over its financial benefits. Female Sarpanches (head of Village Panchayats) often face *reservations* by the community over their abilities to manage, and are subject to *harassment* by opposition party males. Support they do receive is often more passive in nature from women in the community.

*Gender biases* Mpumalanga Province

**South Africa** Women are encouraged to take an active role in decision-making by the Tonga Reconstruction and Development Committee, Mpumalanga Province, but their input is limited. Women have problems attending early Saturday morning meetings since their husbands expected them to stay home, and become suspicious of their meetings with other men. This is set within a broader *cultural context* in which women are generally not supposed to talk in public, particularly in the presence of men, and on issues of public interest.

- The gender balance approach conflicts with the traditional project planning cycle  
Technical designs often fall short of women's needs due to their low input into project design. Project monitoring and evaluation (M&E) needs to account for the long term nature of building female participation and adjusting deeply-held views within society.
- Strategies to increase involvement by women pay lip-service to gender  
A policy that promotes numerical representation of women may be based on a weak assumption that that participation will also follow. This approach may not assess qualitative indicators of increasing participation, such as the creation of an enabling environment.
- Resources directed at gender issues are inconsistent with policy directives  
As well as resources for training, an enabling environment is required that includes affordable day-care, to reduce traditional workloads; and economic empowerment for training measures to be sustained and replicated in the marketplace. **India** In Maharashtra a lack of paid opportunities has prevented female masons trained in Kawlane village from practising their newly-acquired skills.

## REFLECTION

Women are being represented in local DWSS institutions and steps made to involve them through the processes of capacity-building and sensitisation. Common to all case studies was a lack of women represented in decision-making and management, and at more central levels. In this respect there has only been partial adherence to this principle. It follows that women are not typically involved in WRM, since this is still a highly centralised activity. Sensitisation programmes on gender issues and increased involvement of women at various levels in all project phases are being conducted in projects in India, Ghana and Zambia, and in some countries this includes awareness among men. In a number of cases it is recognised that enabling women to participate requires the enabling conditions, extending to childcare facilities and outlets to use acquired skills. Attitudes towards traditional roles of women and men are deep-rooted in culture. Therefore changes in gender balance will take time.

## Principle 7: Capacity-building is the key to sustainability

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Capacity-building is underway in WRM and DWSS alongside the decentralisation process, as new institutions emerge, or existing institutions adapt to new roles. Capacity-building refers to three general areas : training / awareness; financial capacity / resources; and legal mandate / policy framework. In many countries capacity-building is not being given due recognition at the national level and resource allocations are therefore inadequate at lower levels.

## STRENGTHS

- Capacity development, in particular of skills, is prioritised in national and regional programmes  
**Zambia** (Southern Province), UNICEF and CARE provide technical support at the village level through e.g., handpump installation and mender training and hygiene education. **South Africa** Umgeni Water-funded projects for community DWSS involve education on health and sanitation issues through plays and health officer talks. **Colombia** an agreement exists between Tolima Health Service and CINARA for training in sanitation and community planning of workshops.
- Institutions related to capacity-building are being developed (see principle 4)  
**Ghana** a Training Unit coordinates training for target groups such as District Assemblies and project staff. **India** In Gujarat state, SEWA works with local leaders to provide both practical and formal training in financial matters such as book-keeping, accounts and banking and marketing of local products, and in more strategic issues such as organisational skills to establish linkages with government programmes. In Maharashtra and **Colombia** there is an emphasis on technical skills in water-efficiency measures such as training in water connections, installation of meters and meter reading.
- Capacity exists in traditional management structures (see principle 4)

## WEAKNESSES

- The typical project cycle does not allow for effective capacity-building  
Donor funding and evaluation of time-bound projects do not allow effective M&E of process activities such as capacity-building, and associated benefits that may develop over a period of years following implementation.
- The local government level lacks capacity and resources  
**Zambia** (Northern Province) D-WASHEs lack the financial resources for necessary training and support to V-WASHEs, and V-WASHEs lack the capacity to organise themselves. **Ghana** technical capacities in terms of training aids and refresher training to WATSANs are insufficient. **South Africa** Umgeni Water's training and capacity-building department does not have the *legal mandate* to follow-up its recommendations to communities, and is viewed as more a community liaison unit.
- The increasing use of contractors may compromise progress in capacity-building  
Project budget controllers may perceive capacity-building initiatives as delaying service delivery, therefore contractors may not be trained or paid to deal with these matters.
- The capacity of local traditions / skills is often not addressed in training  
**Ghana** in spite of resource and management capacities, WATSANs face problems in passing on knowledge due to a lack of cooperation with traditional leaders who are left in a vulnerable position as they are left out of initiatives. As well as acknowledging the capacity of traditional leaders, efforts need to be more sensitive to local cultures and languages for effective communication.

## REFLECTION

The need for capacity-building has been endorsed in initiatives in the majority of case studies at various levels, and often translated into practice. *Participatory techniques* are being recognised as key in community-level problem identification and solving in many of the local DWSS case studies, indicating the effectiveness of hands-on training. However, progress is being undermined by the lack of adequate resources being directed to these levels and M&E to assess whether approaches are indeed building capacity. The contribution of traditional community management structures is only gradually being recognised and sensitivity to local cultures incorporated into training programmes.

### Principle 8: Water should be treated as having an economic and social value

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In the DWSS sector the recognition of the economic and social aspects of water is growing. Policy is shifting towards demand management as water becomes increasingly scarce and users need to be managed. The concept of water as an economic is gradually being acknowledged in allocation and user efficiency measures. Water is also seen as a public or social good, essential to society at large and vital to a healthy living environment. Some users may 'free-ride' or rely on the efforts of others to pay for these goods; for instance, some households may not pay their dues for wastewater disposal, a negative externality<sup>8</sup> in terms of public health and the environment. In many rural situations communities regard water as a gift from God and are not prepared to pay for the water resource. However, communities are increasingly willing to make contributions to the water supply although often limited to the investment / building phase, rather than extending to recurrent local financing of O&M.

## STRENGTHS

- National and regional policies reflect the economic good concept

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<sup>8</sup> an *externality* is an external cost to society, unaccounted for by a water user, such as pollution



Directives related to water tariffs and metering make clear that water is an economic good, implying there are costs associated with use of water (in terms of social and environmental costs), as well as costs in provision, treatment and disposal (see principle 3).

- Many communities pay for investment costs and / or O&M (recurrent costs) and payment may be in cash or in-kind

#### *Designing a local tariff system*

#### *Kalomo District*

**Zambia** It is a requirement for a village requesting financial support for a DWSS project to make an initial contribution. In Kalomo district communities are required to purchase cement for above ground works i.e., apron, drainage and possibly cattle drinking troughs. Communities carry out pre-project works such as collection of stones and sand for construction of headworks and these labour contributions are costed and must account for 25% of the *investment cost*. In addition, the community pays user fees for O&M : for purchase of spare parts, lubricants for handpumps and to pay pump menders. Part of the fees are also used to pay transportation for the district-based maintenance team where local menders can not repair faults. The communities decide on the amount of user fee rates to pay. In the three villages of Chiyoka, Mazambani and Simalele, the communities agreed on 3,000 kwacha per household per year. Funds are often raised through *in-kind payment* where users are unable to raise a cash payment; maize was accepted as a convenient in-kind payment. Vulnerable groups such as the blind and the aged draw water free of charge.

- Tariffs for irrigation water are supported given water's use in production

Levies for irrigation water are typically an area basis with payment often in-kind, such as maize after the harvesting period. **India** Gujarat (Piprala Checkdam Project) ; **Zambia** there is a local perception that paying for irrigation water is reasonable due to its use as an input in production; tariffs are often levied on a *per hectare* basis.

- Users show a willingness to pay (WTP) where service levels are satisfactory

WTP for water as an economic good relate to the cost and quality of service. **India** In Maharashtra state respondents indicated their WTP if they received adequate pressure in their taps.

- Tariffs may be progressive, based on volume consumed

*Progressive tariffs* are applied where a volumetric measure of water use can be made, such as through metering; this method is viewed as economically efficient since users are aware of each extra or marginal unit they consume. **Cambodia** Battambang, monthly rates are levied *per cubic meter*. (See principle 3, **Colombia**)

- Administrative systems exist for cost recovery

**Zambia** (Southern Province) the user fee collection system is becoming more transparent, through *payment registers* and *receipts*. **Cambodia** Battambang, a system of *warnings* to those who default on payment is in place, as well as the authority to cut the service; Water User Committees regulate illegal connection of pipes and have developed a fine system for misuse of water.

- Increasing privatisation in the DWSS sector reflects the concept of economic value

Water is treated as an economic good in the marketplace since private suppliers meet demands for water where there is a WTP, e.g., **Cambodia** Battambang Town (see principle 3)

- Tariffs often relate to the water supply system itself (rather than water resource) in cultures that perceive water as a gift from God

**India** In Maharashtra state, Village Panchayats levy a *per annum* water tariff for public standposts and private connections within a range determined by government.

- Tariffs often explicitly reflect the social value of water in subsidies and exemptions

**Cambodia** in Panh Nha village, fees are graded according to *ability to pay* (ATP) with levels of poverty assessed through a PRA exercise. In **South Africa** in Mgeni Catchment a policy of *cross-subsidisation* from urban areas supports water delivery of drinking water to remote rural areas. **India** In Madhya Pradesh, there is a full government *subsidy* to the DWSS sector and maintenance grants to Panchayats.

- *Financing policies may reflect social objectives in prioritising network improvements in peripheral areas*  
**Cambodia** In Battambang, government *subsidies* are available to private agents who investment in extending supply networks to remote areas. **South Africa** policy emphasises developing the supply network to former homeland areas without access to safe DWSS.

## WEAKNESSES

- *Low user support for tariff systems affects cost recovery*  
Factors influence cost recovery such as : ATP, WTP (due to low quality / unreliable service), or low awareness of the true economic costs of DWSS. **Cambodia** In Battambang, government officials view the cost of water on the open market as unreasonable given their low state salaries. **Zambia** (Northern Province) intermittent water supply from public schemes affects cost recovery. In many cases villagers are unaware of the *rationale* behind tariff structures, or the need for clean water itself, since users may revert to contaminated, traditional supplies in the event of a technical fault.
- *The financial capacity of local institutions is low*  
The *piecemeal* approach of many community financing policies slows progress in gaining financial autonomy and DWSS project independence. **India** In Maharashtra state, Village Panchayats cover only *minor replacement costs* with dependency on district-level Zilla Parishads. In Gujarat state, *monitoring* of villager O&M payments is often unreliable. **Ghana** accounting procedures in some villages are not transparent and WATSANs lack the authority to enforce fines. **South Africa** in Mgeni Catchment urban households regard water bills as an estimation of household consumption, since meter reading is ad hoc.
- *Irrigation water is used inefficiently in the production process*  
Tariffs are often based on (1) *area irrigated*, or (2) *fixed rates* divided between users or collected in a watershed development fund. Since irrigators are unaware of the economic cost per unit of water, they lack the incentive to use water efficiently. *Traditional irrigation practices* such as field flooding for rice cultivation reinforce this problem.

## REFLECTION

Recognition of this principle can be seen largely in the implementation of *cost recovery* mechanisms. In the majority of case studies, contributions (monetary and in-kind) are being made for O&M and / or fixed costs of water supply. However, systems are generally highly subsidised and progress in cost recovery often limited by low financial transparency. A more accurate reflection of the true economic value of water is most clearly seen under conditions of greatest scarcity in urban areas through 'efficiency' or volumetric pricing. In some areas water is regarded as a gift from God or nature. However water tariffs were still levied in Zambia and Ghana, and charges that focused on the water supply scheme were adopted in India and Nepal to by-pass this sensitive issue. Government policy defining water as a social good can be seen throughout the cases in terms of : national *subsidies* (Maharashtra, India); *cross-subsidisation* to disadvantaged areas; and *extension of the distribution network* (South Africa).

### 4.3. Concluding points

The overall adherence to the eight principles varies according to the emphasis and scale of the project under review, as well as more complex political, economic and cultural factors. However, some basic trends can be observed that underlie application of the principles.

Progress in **catchment and source conservation and protection** is in its embryonic stages, with general awareness and institutions emerging, but typically on an ad hoc basis. Experience with local level measures suggests that there has been progress although this has not been clearly documented in all cases. At all levels there is a clear need for recognition of the role institutions have to play, by assigning bodies legal

status and adequate resources to carry out clear, mandated functions in WRM and DWSS. Different roles will be suited to different management levels : broadly, legislative oversight at the national level; coordination and delegation / guidance at the regional level; and adoption of new management responsibilities at the local level. Where these functions can be combined in a catchment-level water body may be the optimal management solution. In regard to WRM progress was limited, emphasising the need for a new approach of management along physical boundaries. Forums for **dialogue between stakeholders** needs to go hand-in-hand with the **decentralisation process in management**. **Allocation between stakeholders** is often complicated by unclear water rights systems; the strengths of these systems need to be built upon, particularly local level capacities.

**Efficiency in water use** is becoming a widespread phenomenon, with the greatest progress in urban areas where the conditions exist for efficiency pricing (through metering); and in informal local systems, in response to water scarcity. Progress is limited where inefficient cropping patterns and irrigation practices predominate, although local measures through capacity-building improve this situation in some contexts such as Maharashtra.

Progress in **striking a gender balance** is closely linked to capacity-building in DWSS. Indicators for success such as creating the enabling environment for progress, in terms of sensitisation, adjusting the project cycle to include process approaches, training and providing economic opportunities are not easily measurable and often long-term in outlook. Most case studies present strong policy advances, although resource allocations are often inconsistent with this, limiting progress. The Gujarat, India case study reveals the sensitive approach that is required for the long-term process of changing attitudes. The principle **capacity-building is the key to sustainability** runs through each of the principles and can be viewed as a tool at multiple levels for development. There is a general need for greater progress at lower levels, in particular in creating an enabling environment and associated M&E of progress. Second is the need for recognition of the value of existing community skills and local cultural conditions, particularly with regard to the role of women. Progress in **water treated as having an economic and social value** is clearer to assess. Most case studies reveal that a combination of both components is the norm. The degree of adherence is a function of government policy and economic and social factors. The typically rural nature of the DWSS case studies places more emphasis on the social value of water as a basic need and associated tariff support. The local level nature of the projects indicates the potential for collective action based on principle 4: community input into DWSS projects to increase a sense of ownership; local monitoring by users and supplier accountability; and local determination of tariffs versus social support.

## 5. Recommendations

### 5.1. Introduction

Based on the findings in chapter 4 the individual case study reports and the synthesis workshop, a series of *recommendations* have been drawn up to reflect current and proposed directions in integrated Water Resources Management (WRM) in the drinking water supply and sanitation (DWSS) sector. External sources are used to explain some of the concepts in more depth. Comments from advisory group members relate in particular to institutional structure in DWSS and WRM (see principle 4), and gender (see principle 6). The general *relevance of the principles* is assessed, drawing on selected case study illustrations. Readers need to assess the relevance of each principle to their own case study, drawing on general themes from this paper, to shape recommendations to each national, regional or local context. It should be noted that the following recommendations are not exclusive and simply reflect the findings of the projects.

### 5.2. Principles recommendations

#### *Principle 1 Water source and catchment conservation and protection are essential*

In the past, water for agricultural irrigation, DWSS and other sectors has been managed through a sectoral approach. With the over-exploitation of river basins and multiple demands for water rising simultaneously, greater user integration within a catchment is required. This approach includes (1) demand management of *abstraction / direct use* for instance in irrigation and DWSS, and (2) management of *indirect uses* of water such as forestry.

##### Establish a clear focus for WRM in policy directives

Policy directives include *guidelines* for water quality and solid waste disposal, and catchment protection through buffer zones around riparian areas and water sources (**Colombia** catchment protection initiatives). Appraisal of DWSS and broader water supply projects should reflect costs within the catchment such as pollution / waste disposal. There may be a *collective solution* to the problem of high transactions costs in monitoring polluters within a catchment (box 1).

##### *Informal methods of regulating pollution*

##### *bargaining arrangements*

box 1

There is an alternative approach to the high cost, frequently inadequate pollution control measures. At the local level, a *cooperative agreement* within a close-knit community is possible where trust and cooperation are high, and parties share information over the costs involved in discharging and abating (controlling) pollution, regardless of who owns the water / land rights. The *transaction costs* of collectively reaching and enforcing an agreement within a local area are lower than for a central government administration.

Where the polluter has land or water rights, receiving parties could negotiate as a collective to pay the polluter to reduce discharges, up to an 'optimal' point beyond which the pollution is not severe enough to continue. Where the polluted group holds the rights, the polluter would pay to pollute, since at these low levels of pollution investment in pollution abatement equipment is too costly.

These arrangements may avoid costly litigation procedures and ensure that the polluter pays principle is more adequately met (where the polluter does not hold the water / land rights).

Source : Field, 1995

##### Organise WRM institutions along catchment boundaries

WRM institutions such as Water Boards may fulfill this role, or an *impartial research institution* may guide WRM institutions, (**Ghana** Water Resources Research Institute). A national monitoring unit may be required to delegate responsibility to lower levels and ensure an adequate budget for enforcement (**Ghana** Water Resources Commission).

- Foster coordination between users in a catchment  
Competing land uses need to be reconciled through *dialogue* between relevant agencies, e.g., between forestry and environmental agencies : agreement over long-term harvest and reforestation plans, detailing harvest techniques (e.g., clear-cut versus selective cutting) in the context of wildlife habitat and catchment conservation requirements (**South Africa** Mgeni Catchment Forestry Review Panel). An adequate budget for *enforcement* is critical to ensure compliance by agencies. Evaluation of *cumulative effects* may involve a review of *existing or future water rights*, particularly groundwater rights in irrigation that may lead to a race to exploit the resource (**India**, Maharashtra). A new approach of prioritising environmental and social rights to water needs to be assessed. *Natural resource management initiatives* need to extend to other sectors such as forestry, irrigation and industry. With regard to forestry, this implies assessing the cumulative effects of timber harvesting on common property resources (e.g., for slash-and-burn cultivation and firewood collection) as well as harvesting on private lands.
- Increase local initiatives and traditional measures  
*Sub-catchment* initiatives involving communities can be guided by regional institutions (**South Africa** Umgeni Water). *Sub-catchment DWSS* projects tailored to local interests can be used as a vehicle to increase awareness of broader, catchment-level WRM. This may include *education programmes* on water quality as it relates to hygiene and the provision of safe drinking water supply in rural areas (**Ghana**). Other solutions include the formation of *community surveillance* teams to monitor water resources (**Colombia**); and promotion of traditional protective measures (**Zambia** (Northern Province)). Adequate *resources* must be assigned to this sub-catchment level under regional WRM policy.

**Principle 2: Adequate water allocation needs to be agreed upon between stakeholders within a national framework**

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Following the decentralisation process of WRM (see principle 4) allocation is optimal at a catchment level that can represent all interested parties. An optimal allocation may involve a system of public petitioning for water rights to direct water to users that demand it and have a WTP (**Colombia**, San Felipe). An oversight body (such as CORTOLIMA in the case of Colombia) can ensure that social / environmental as well as efficiency goals are met. Informal allocation methods that rely on local trust and cooperation, or traditional methods and local by-laws will be important for DWSS projects.

- Coordinate water allocation between parties with a stake in the resource  
As water scarcity increases and a premium is placed on freshwater sources a shift can be expected towards prioritising DWSS as an essential demand, and conservation measures applied in irrigation. Irrigation supplies, whose economic return per unit is relatively low, will be transferred to higher value uses: this may be based on *social* priorities such as essential DWSS, or *economic* values under a water market). Water reuse will become increasingly important (Shuval in Lucas, 1997). *Water rights* may have a role to enable a more efficient allocation, since irrigators will become more aware of their use of water if they can sell remnant rights to urban DWSS users or to a fellow irrigator. A regional forum enabling *public requests* for water rights may be established in some contexts (**Colombia**). This may be a sound compromise between a situation of no rights where there is high inefficiency in water use, or a system of private rights, where social goals may be overlooked. India has recently made progress by prioritising DWSS in legislation, and this needs to be implemented through a decentralised institution that can reconcile sector interests, in particular the irrigation and DWSS sectors. *Within* the DWSS sector itself, under a project allocation needs to be coordinated with the input of all users at the local level, particularly women with their knowledge of quality and quantity requirements. DWSS projects should also consider supply needs that may be located outside the project area (**Ghana**).
- Encourage local water allocation initiatives and traditional roles (see principle 4)  
Informal allocation methods that rely on local trust and cooperation, or traditional methods and local by-laws at the community level need to be appraised for application in DWSS projects. Local systems may be flexible to changing needs and supply conditions, enabling measures during times of scarcity such as local prioritisation and queuing systems (**Zambia** Southern Province).

### *Principle 3 Efficient water use is essential and often an important water source*

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With increasing water scarcity, efficient water use is becoming ever-important. Efficiency within irrigation for instance is often vital to DWSS in water-scarce areas and can optimise allocation among stakeholders within a catchment or sub-catchment (principle 2). Significant efficiency gains can also be made in urban contexts, during storage, conveyance and use. Various efficiency measures taken in the DWSS sector can improve project operation.

- *Address efficiency objectives in the national WRM policy framework*

A policy framework for efficiency can coordinate best practices within user groups, contributing to improved WRM at the broader scale. Measures include positive incentives to adopt water conservation technologies in irrigation, and in local water supply systems. Local measures such as reuse of wastewater in crop irrigation may need to be replicated at the broader scale (**Cambodia** Battambang; **India** Gujarat).

- *Provide the capacity to implement policy directives relating to efficiency*

Local *technical and management capacities* are needed, such as technology transfer promoting drip irrigation methods to local farmers or installation of water meters in the community (**Colombia** San Felipe).

- *Devise a tariff policy that complements water efficiency measures (see principle 8)*

In line with the concept of progressive tariffs based on volume of water used, there is a need for pilot projects to assess the potential for metering in rural / peri-urban areas and in irrigation (**Colombia** San Felipe).

### *Principle 4: Management needs to be taken care of at the lowest appropriate levels*

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Contrasting management systems characterise DWSS and WRM. The DWSS sector is under a process of decentralisation to lower administrative levels that have the detailed information to address local service provision and management. In many contexts this process involves an adjustment in the role of regional and district bodies from bulk water suppliers to facilitators of lower-level management (box 2). Community management is seen as an important process to improve the quality of services both in terms of water quality and reliability in supply. As users become increasingly involved from the initial stages of the project cycle through to M&E, a sense of a 'stake' in the water supply system and its services develops.

#### *Institutional models for management of DWSS*

*box 2*

- *a national body* : formulating legislation and guidelines for DWSS; regulation of public concerns such as water quality and provision of essential supplies by water supply bodies in both urban and rural areas.
- *a water utility or private company* : practical implementation of water supply projects in urban areas and technical / managerial guidance of lower level management bodies through contracting services. Where cost recovery is not used in recurrent financing of DWSS national regulation is required.
- *local government* : practical implementation of DWSS projects integrated with health, sanitation and education programmes and coordination of all users / interest groups through local stakeholder forums.
- *local level management body* practical implementation of DWSS provision in rural areas, with guidance from higher level government bodies. Enabling local user forums and decision-making through consensus, and reliable local DWSS service provision and management systems (see Chapter 4, principle 4).

In contrast to DWSS, the case studies are characterised by WRM activities principally at the national level. Local level measures can also be discerned, through traditional measures or recent WRM initiatives (see Chapter 4, principle 1). Where practicable, WRM should follow a similar decentralisation path, but along *physical units* such as the catchment or sub-catchment. This process allows stakeholder involvement and WRM decision-making at a more appropriate catchment or sub-catchment level, where more detailed information regarding water quality, quantity and demand is more accessible than at the centralised level. Various institutional levels have a specific role or function in WRM (box 3).

#### *Institutional models for WRM*

box 3

- a *national body* : formulating legislation and guidelines for WRM; regulation of public concerns such as water quality and environmental health standards; required to delegate responsibility to lower levels. Water Resources Commission (*Ghana*), a national WRM institution with a mandate to regulate and manage water resources and coordinate policy. The Commission provides a national-level forum through membership of the Commission by DWSS organisations, irrigation agencies, environmental protection agency, etc.
- A *catchment-level institution* : coordination of direct and indirect water uses within a catchment; access to data regarding water quality, supply and demand; and practical implementation of WRM projects. This institution requires a clear mandate for WRM to prevent responsibilities merging with those of government agencies. In *Ghana* the national Water Resources Research Institute (WRRI) is contracted at the regional level for water resource monitoring activities; *South Africa* in Mgeni Catchment, Umgeni Water is a regional body assigned functions of both water supply and WRM.
- a *local management body* : practical implementation of WRM projects by a local institution, with guidance from higher levels such as the district, e.g., *India* Village Watershed Committees, Madhya Pradesh; *Ghana*, Volta Region, WATSAN committees (see Chapter 4, principle 1).

New regional and local bodies may need to be created, including public-private sector partnerships, and the roles of existing institutions, particularly at higher levels, will need to adapt. National and regional institutions will increasingly take on the role of facilitator and monitor. In some countries attempts are being made to interlink DWSS and WRM functions in catchment-level institutions such as Umgeni Water, South Africa.

Local management combined with *community participation* is being seen as a positive trend but requires awareness-raising and capacity-building between all levels of management. Local institutions need capacity to make choices and define priorities, e.g., regarding technology choice for DWSS, or efficiency measures and allocation concerns for integrated WRM. Governing bodies need to formally recognise local institutions by building capacity in three critical areas of : training / awareness; financial capacity / resources; and legal mandate / policy framework (see principle 7).

#### Principle 5: Involvement of all stakeholders is required

The term stakeholder is often used to represent multiple, competing user groups within a catchment. WRM aims to ensure that interests or 'stakes' of each group are clearly specified. To enable dialogue, physical catchment-level data and current and projected water demands are needed.

- Develop forums for stakeholder consultation  
Decentralised WRM institutions provide a vehicle for stakeholder consultation, through access to required catchment-level information. Mechanisms are needed to ensure fair participation of all user groups, including environmental and domestic interests (principles 1 and 2).
- Implement by-laws and registration of user committees (principles 2 and 4)

Legal mechanisms are needed to guide forums at the various levels (regional, district, local) and internally resolve stakeholder conflict, possibly supported by an external regulatory agency. Local communities need to be given the ability to address water quality and quantity changes to address problems through informal arrangements or formal by-laws.

**Principle 6: *Striking a gender balance is needed as activities relate to the different roles of men and women***

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DWSS project management needs to involve women in all phases of the project cycle, from project design considerations through to management and decision-making. A more balanced contribution to DWSS by both genders is required to address their different needs and roles. The traditional role of women in local water supply and sanitation signals a need for their input into DWSS projects, a catalyst for women's involvement in wider WRM issues.

**Build capacity to sensitise organisations**

Gender sensitisation programmes need to be promoted at all institutional levels early in the project cycle at the design stage through to M&E, for effective implementation. In particular, sensitisation needs to target men at the village level to enable women to take on new responsibilities with confidence. (*India Gujarat*).

**Build capacity to enable women to adjust and develop**

Capacity-building needs to include *literacy and awareness* creating programmes in certain cultural contexts; separate forums for women to participate; the enabling environment (through measures such as child-care facilities as well as sensitisation); and provision of *paid opportunities* for women to apply their knowledge.

**Develop gender-specific legislation to guide the process**

Increasing the role of women in management, particularly at higher levels, may require legislative changes regarding *equal opportunities* in the workplace where women are often under-represented.

**Principle 7: *Capacity-building is the key to sustainability***

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New or transformed WRM and DWSS institutions require capacity in three general areas : training / awareness; financial capacity / resources; and legal mandate / policy framework.

**Recognise capacity-building as a priority in sustainability of DWSS management**

Government and donors must recognise the need for capacity-building at all institutional levels as roles and responsibilities adjust under the process of decentralisation. At the national level defining the legal mandate of institutions and policy framework are key, extending to emerging local-level institutions. At a catchment and sub-catchment level legislation should support customary laws and promote the collective interest of individual water users in relation to powerful vested interests. A second role will be in monitoring DWSS service provision and WRM activities. Regional and district-level institutions including the private sector will provide guidance and support to lower levels through training / awareness, and M&E of capacity-building progress. At district and local levels an emphasis will be placed on training / awareness in day-to-day management functions such as O&M. A strong component of awareness-raising relates to gender (principle 6) and cultural considerations such as valuing traditional management practices and institutions. Accordingly, there needs to be adequate access to resources, including financial backing, at each level.

**Build flexible training programmes**

Flexible training needs to include (1) *refresher training* for local / district institutions and other bodies with high levels of project responsibility; (2) *extension of services beyond the project area*, for instance in cases of public health education where other users within the catchment may also benefit e.g., *Zambia*, (Northern Province) there is a recognition that programmes need to conduct health education talks not



only to communities with Irish Aid-supported wells, but to all communities with any type of water source, since this will assist integrated WRM initiatives; (3) *coordination with different training organisations* to place water supply issues alongside other local development processes; (4) *creation of a permanent institution* at the regional level assigning mobile training teams to train communities according to their needs; and (5) *adoption of a programme for existing staff*, so that for instance, the project engineer or contractor has the capacity to oversee or fulfill these needs. Informal, interactive training should be emphasised, enabling participants to contribute their ideas and personal experiences (**Ghana** Volta region, training of District Management Committees). Institutions and communities can learn by experience and build on experience (**Colombia** San Felipe, community management of low-cost treatment technologies).

**Principle 8: Water should be treated as having an economic and social value**

Treating water as an economic good suggests that *market principles* should be used in its allocation and pricing. This can be met through operation of a water market (principle 2). Often the conditions for a market for water are absent and social goals are being prioritised by governments (**South Africa**, privatisation of extension of the distribution network; **India** Madhya Pradesh, full government *subsidy* to the DWSS sector). Both goals may be met through a public regional forum for allocation of rights, overseen by a regulating institution, as seen in Colombia (see principle 2, Chapter 4). This enables incentives to improve efficiency conservation measures, while social goals can still be addressed.

The financial capacity of local DWSS institutions needs to be improved through the following measures :

- *Develop a clear financing policy for local management of DWSS*  
Local determinations of tariffs, and informal mechanisms for enforcement and fee collection may be more finely-attuned to local conditions and therefore given more support (**Zambia** Southern Province).
- *Raise awareness of investment costs and tariffs through campaigns*  
Project staff and district management committees need to sensitise communities as to the economic value of water, in terms of costs to local authorities of water provision and informing users of the *need and benefit for contributions*. In line with this, as communities become more involved in management of DWSS there will be pressure for increased local authority accountability in fee collection and service provision. **Colombia** Tolima Department, users were willing to accept an increase in water tariffs where tariff development was transparent and a high standard of service provided.
- *enforcement of tariff policy through payment incentives / penalties (box 1)*  
*Capacity-building* is required to implement tariff systems, through measures such as training in account keeping and refresher workshops. *Enforcement* will be key to effective cost recovery (see box 4). The system will vary according to the context : a and b may be more prevalent under local management, relying on community cohesion and self-regulation; on the other hand, c and d are more applicable to urban contexts where the relevant legal mechanisms are in place.

<i>Box 4</i> <i>payment incentive / penalty type</i>	<i>Methods of increasing local cost recovery</i>
<i>positive incentives</i>	targeted at individual consumers or user associations, such as discounts for timely payments
<i>a. financial sanctions</i>	set above the value of supplies, for improper water use or lack of payment; weakness in pre-empting legitimate protesting of service standard ( <b>Nepal, Gulmi District</b> )
<i>b. social sanctions</i>	by local people, an informal mechanism encouraging collection through peer pressure

c. enforceable penalties	for non-payment, such as water disconnection ( <i>Cambodia, Battambang Town; South Africa, Pietermaritzburg; Colombia, San Felipe</i> )
d. legal sanctions	with the precondition of institutional mechanisms such as laws in place; limitations in the high transactions costs of court action and potential for inadequate fines ( <i>South Africa, Pietermaritzburg</i> )

- progressive tariffs and the water metering for consumption beyond essential uses  
In lift irrigation schemes where inequalities in allocation exist, there may be a case for metering for large-scale irrigators; the rate structure could be such that marginal/small farmers are charged a low unit rate for their initial use, with progressive increases as consumption rises beyond essential uses (*India Maharashtra*).
- tariff variation for remote / poor areas or formerly subsidised users  
Essential levels of water supply and sanitation are often viewed as a basic human need with subsidies linked to *ability to pay*. Tariffs levied outside the DWSS sector in agricultural irrigation for instance, need to consider the social costs of tariffs to formerly subsidised users, along similar ATP guidelines.
- subsidies evaluated for effects on cost recovery  
Subsidies on DWS will limit cost recovery by supply agencies, increasing their dependency on higher levels for financing, and reducing the capacity for local financing of O&M costs. This may call for alternative methods of support that do not directly affect the water supply sector, e.g., specific welfare programmes to provide essential DWSS service levels to disadvantaged areas.

#### *Social goals and the loss of cost control*

A weakness of price differentiation and subsidies is the move away from *efficiency pricing*, based on the true cost of supply. In the context of irrigation, Small and Carruthers (1991) suggest that rather than use tariffs, a specific *welfare programme* should be developed for this purpose, to reduce the burden on water supply agencies such as low cost recovery, and prevent potential distortions in the water sector that subsidies may create, since users are no longer paying for water at its true market value. This may have relevance for urban water supply programmes where private contractors are supplying water at market rates (*Battambang, Cambodia*).

Source : Carruthers and Clark, 1991

### 5.3. Concluding points

Areas for improvement in WRM and DWSS management practices can be discerned from the above. The following points are not exclusive, but rather represent the approach taken by the case studies.

- A clear **WRM policy framework** is required that includes issues of water quality, solid waste disposal, buffer requirements for catchment protection and related land use practices. Compliance with WRM legislation needs to be supported by developing forums at the appropriate level through communication, coordination, monitoring, and where necessary, enforcement. A regional-level institution may guide this process. A clear national policy framework for DWSS is required that that should be integrated into the WRM framework; that is, water supply should not be addressed in isolation from available resources (both in terms of quality and quantity) and the interlinkages with competing uses. DWSS policies should also address WRM principles such as source conservation, protection and efficiency.
- The WRM framework must include strategies for meeting both **equity and efficiency objectives**. This should build on the strengths of existing national and local (by-laws, customary laws) water rights systems, and where necessary adjustments may consider new priorities in allocation, such as essential water provision (*India, Maharashtra*). In cases of increasing water scarcity, essential DWSS provision may

be met by reallocation from irrigation to DWSS (through conservation measures applied in the agricultural sector). A public system of allocating water rights can address both social / environmental and efficiency goals.

- **Decentralisation of WRM** is required, where practicable at the catchment level or through delegation by a national WRM institution. Progress in decentralisation of DWSS must be continued, with attention focused on providing capacities at various levels for institutions to adjust to new roles and responsibilities. This process is needed to allow **forums for participation** at appropriate institutional levels : to resolve allocation issues regarding catchment-level WRM and at the more local scale issues in allocation of drinking water supply. Only with the involvement of all stakeholders can the sustainable use of scarce water resources be determined. There is a **hierarchy of responsibilities** ranging from national legislation, policy framework and allocation of resources; to regional bodies for catchment level coordination, regulation, management and consultation; to local level community-based committees that address local level resolution of conflicts, day-to-day management and integration of traditional practices. Monitoring of water use may relate to this hierarchy, with local mechanisms encouraged, supported by regional capacities where necessary.
- **Capacity-building** in the DWSS sector and WRM requires formal recognition in national legislation in the three principal areas discussed (principle 7). It is key in creating the enabling environment for participation and promoting the long-term process of sensitisation / attitude change and economic opportunities with regard to women. Innovative approaches to stimulate development need to be identified and promoted, particularly at local governments / district and community levels.

## 6. Evaluation

### 6.1. Evaluation of the Synthesis Workshop

Progress was evaluated by a round table discussion and a questionnaire at the end of the workshop. Participants were asked to reflect on the workshop and the project as a whole. In general the impression was very positive. Importantly, constructive points were made as to how the workshop may have been improved. Below, the salient points are presented.

- **Extent the workshop enabled a synthesis of lessons and formulation of recommendations for WRM:**

The workshop met participant objectives as a learning process of DWSS sector activities in other countries, with specific reference to WRM. It was successful as a brainstorming session regarding the various experiences shared, in order to bring out appropriate recommendations. However, development of specific strategies for inter-sectoral work was considered weak. Second, a lack of time precluded a detailed discussion of individual case studies.

- **Strengths and constraints of the workshop:**

- A strong point was gaining the knowledge of other experiences. Second, in terms of the methods used, intensive participation and a flexible 'democratic' organisation that tried to accommodate everyone. Regarding organisational aspects, kind staff and good support and organisation were singled out.
- Experiences were limited to the DWSS sector, lacking a more broad representation from the water sector. Second, it was felt that a brief presentation on WRM practices and approaches may have increased general awareness, as well as provision of the individual case studies to each participant. In terms of the time constraint, an extension in days was recommended. It was also felt that more strict chairing would have improved time efficiency. One participant questioned the number of principles assessed, since there were only four at the 1992 Dublin meeting.

### 6.2. Evaluation of the overall project

- **Extent that experiences of the assessment were documented :**

The case study findings indicated the process of implementation of the principles had begun. It was suggested however, that some principles had not been followed up. Second, it was felt that the findings would not necessarily be indicative of WRM projects elsewhere.

- **Relevance of assessment methods and extent of synthesis of outcomes:**

- The participatory approach yielded good understanding and consensus. Skills of self-assessment and analysis by staff and community members who assisted in the study were developed. However aspects of the assessment were not specific to some local contexts. Hardships were also encountered, with regard to logistics and follow-up support during the assessment.
- The small groups and plenary sessions helped to consolidate the findings and share experiences. However, due to the time constraint it was not possible to synthesise individual case studies.

- **Cooperation between participants, advisory group and IRC team during assessment:**

There was good communication and support by the IRC team. Moral support and useful comments for the draft report were given through regular telephone calls. However, comments from the draft case study reports could not in all cases be send before the synthesis workshop.

- **Personal gains from participation in the WRM project:**

A general gain was meeting, learning and sharing with people that have experiences in other countries. Second, an understanding of the importance of the WRM principles and their applicability, and skills in participatory research, analysis and reporting.

- **Outcomes of participation in your own organisation / project and recommendations:**
  - . incorporation of findings, such as institutional development needs, legislation and capacity development into future and current programmes;
  - . integration of approach into training workshops;
  - . dissemination of knowledge at national and local level to sector organisations, via workshops, guidelines, extension and media;
  - . regular M&E in project area and assessment 1-2 years after implementation; and
  - . at IRC, summary of case studies by WRM in the form of an IRC Occasional Paper series and contact maintained, to keep participants informed about future events in WRM.

## 7. Follow-up activities

Follow-up activities were discussed in two ways. Firstly and in line with the project's main aim it was discussed how and in what form the outcomes of the project could be made available to the sector at large. Secondly we discussed what could be useful and achievable follow-up activities that contribute to promote awareness for and implementation of improved WRM practices.

### 7.1. Dissemination of project outcomes

It was agreed that at the overall project level IRC would produce two types of output:

- a report covering the outcomes of the assessments carried out and reflecting the outcomes of the Synthesis Workshop and;
- an Occasional Paper presenting the purpose, method and outcomes of the overall project that would advocate and contribute to putting more emphasis on good WRM practices.

Both publications will be made available to all participants and their sponsors and widely announced and disseminated to interested parties. Contents will also be made available on the Web.

Locally in the participants organisations and countries a variety of tools and channels will be used to make available the outcomes of the project. The outcomes include the two above mentioned publications but also summaries, articles and presentations by the participants themselves. It was further agreed that participants and IRC would cooperate where necessary to promote wide dissemination and advocacy for the cause.

Participants identified the following areas in which IRC could play a role in stimulating follow-up activities by the participants and actors in the sector at large:

- Produce special thematic IRC newsletters on WRM issues;
- Explore the viability of starting a 'Notes and News' series on WRM issues;
- Keep up correspondence with all participants to jointly operationalize follow-up activities;
- Identify relevant journals and encourage and assist participants to write articles on WRM experiences;
- Explore the possibility to setup new or join existing Email based discussion list on WRM topics.

#### Proposed activities for overall project documentation and dissemination

Activity (proposed by)	Where	How	Who
Report on Assessments and Synthesis Workshop by IRC	IRC	send drafts to participants for comments to be back at IRC by end October	IRC team all participants
Occasional Paper on WRM promising approaches: experiences and advocacy	IRC	send drafts to participants for comments to be back at IRC by early Dec	IRC team all participants
Participants propose IRC relevant addressees for dissemination (Mvula)	IRC	participants send list of names of individuals / organisations and full addresses to IRC	all participants
Follow-up activities done in any of participating projects published in follow-up publication (Nepal)	IRC	IRC to provide format participants to document and send info to IRC	all participants IRC team
Improve documentation of cases (Nepal, Zam-NProv)	participating projects	IRC team members with individual participants	individual participants and IRC team members
IRC to organise meeting with international ESA's where all participants present cases + outcomes (Sewa)	to be identified	to be explored	IRC team
Final report (in summary) on Internet (Sewa)	IRC	on IRC website	IRC team

## Other dissemination activities

Activity	Where	How	Who
Present findings at international conferences (Umgeni)	South Africa		Umgeni
Paper on WRM project at next WEDC conference	to be identified		IRC and interested participants
Dissemination of outcomes and recommendations at various levels and to various stakeholders (Nepal, Zambia, Ghana, Cambodia)	Nepal Zambia Ghana Cambodia India	prepare documents and workshops	Nepal Zambia Ghana Cambodia India
Dissemination in English and national language (Nepal, Cambodia)	Nepal Cambodia		Nepal Cambodia
Translate OP on WRM into Spanish (Cinara)	IRC / Cinara	Source funding	Cinara
Publication of detailed case study (Sewa)	India		Sewa
Publish strategy brief for decision makers in national context (IRC)	individual country with IRC support	interested participants send suggestions to IRC	IRC and individual interested participants
Discuss WRM issues on the local radio (Ghana)	Ghana		Ghana
Write articles on WRM project in project quarterly (Ghana)	Ghana		Ghana
Dissemination of documents to national research institutes and gov. dept's. (Umgeni)	South Africa		Umgeni
Wider dissemination in series of international events over next 2 years (e.g. GWP) (Sewa)	International level		Sewa IRC

## 7.2. Further learning and putting into practise

The outcomes of the project made evident that addressing water resources management issues in typical water supply programmes is still limited. While the awareness that water is an increasingly scarce and limited resource is there and growing, most WSS programmes address WRM issues only in a limited way. Unless specifically set-up as catchment based management programmes, WSS activities are usually not (yet) inbedded in more holistic, multi sectoral approaches that take into account issues related to the management of the available water resources.

Participants concluded that still a lot of learning and experimenting is needed to find appropriate operational approaches. Therefore beyond the dissemination of the outcomes of this joint project other follow-up activities were identified.

## Other follow-up activities

Activity	Where	How	Who
Develop an action learning research proposal to practice participatory WRM on sub-catchment basis (IRC)	countries to be identified	identify partners write proposal identify donor	IRC with interested participants
Proposal for further studies in WRM at national level (Ghana)	Ghana		Ghana
Research proposal for case studies, implementation and/or national evaluation exercise (Umgeni)	South Africa		Umgeni
National/regional workshops on 'stakeholder analysis' of WR issues (IRC)	Southern Africa	Concerted Action, EU funding	IRC Partners in region
Promote WRM approach in water sector (courses, workshops, projects) (Cinara)	Latin America		Cinara IRC
Re-visit / monitor participating and other projects in a year's time and document experience in applying WRM recommendations (Mvula, Bilaspur, IRC)	RSA India		Mvula Bilaspur IRC
Identify joint follow-up activities (Nepal, Sewa)	Nepal India		Nepal Sewa interested participants
Participants should be on IRC mailing list for next 2 years		Check if participants are on list	IRC all participants
Workshop at district level to training and stimulate extension and community training on WRM (Bilaspur, Ghana) - at provincial level (Cambodia)	India Ghana Cambodia		Bilaspur Ghana Cambodia
Recommendations should be practical / replicable (Nepal)	Nepal	Adapt and operationalise recommendations to national context	Nepal
Integrate WRM recommendations in project approach (workshop, training) (Ghana)	Ghana		Ghana
Link Cinara's work with irrigation projects	Colombia		Cinara
Include monitoring of 8 principles adherence in water surveillance programmes	Colombia		Cinara



### *Volta Rural Water Supply and Sanitation Project Volta Region, Ghana (DANIDA) Assessment in Adidome and Hohoe districts*

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Volta region forms the south-eastern boundary of Ghana, extending across three distinct ecological zones : a generally dry coastal belt, a middle belt of wet semi-equatorial forest and a northern dry, savannah belt. It is bound to the west by Volta Lake and the Oti River to the north, both sources of water-borne disease.

The Volta project addresses improvement of drinking water supply and sanitation (DWSS) through local technologies, integrated with hygiene education and community management. The project targets 50 percent of the rural communities in Volta region to improve social and economic conditions, with an emphasis on the incidence of water-borne disease. The assessment involved three communities with distinctive water resource characteristics. Mafi Dekpoe / Tedeapenu dam, Adidome district is distinctive for inter-sectoral water allocation from the primary water resource, a dam impoundment reservoir. Nyagbo Emli Israel and Santrokofi Bume communities, Hohoe district focuses on community management of gravity-fed springs and standpipe supply.

### *Northern Province Development Programme Northern Province, Zambia (Irish Aid) Assessment in Kasama and Mbala districts*

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The setting for the Irish Aid project is a formerly water-abundant upland area, where in the last decade changing rainfall patterns and un-regulated water diversions have increased the pressure for integrated WRM. The main emphasis is provision of DWS to rural areas targeted for a high incidence of drought and water-borne disease. The project began in Kasama District in 1983, supporting development and rehabilitation of village wells with community input; this extended to a sanitation project in 1992, involving pit latrine construction. The assessment involved six communities from Rural Health Centre catchment areas in Kasama and Mbala districts.

### *Support for Water, Sanitation and Hygiene Education Projects in Drought-Affected Areas Southern Province, Zambia (UNICEF) Assessment in Kalomo district*

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The project area is severely affected by drought and characterised by a short wet season in which groundwater recharge is only partial so that surface water is present only during the wet season. As a consequence, communities rely on groundwater as the only reliable source of DWS.

In 1994/5 a project was initiated to mitigate the effects of drought and provide accessible, reliable DWS and sanitation with the construction of water points and pit latrines. The case study for the assessment comprised the three villages of Chiyoka, Mazambani and Simalele located in a catchment stretching across two provinces of Kalomo district. The three villages are representative of the water supply system of wells and boreholes.

### *Tonga Water Supply and Sanitation Project South Africa (Mvula Trust) Assessment in Mpumalanga province*

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The project study was carried out in Mpumalanga province, which comprised homelands (the Eastern Transvaal) and a single 'white' province under the South African apartheid state. The former province is characterised by reliable, bulk water supply, while the former homelands, located in drought-prone regions by poorly-operated small / medium-sized bulk schemes or groundwater supplies. The Mvula<sup>9</sup> Trust-funded Tonga and Mohlala Water Projects are located in former homeland areas. The Tonga Water Project involves an extension of the distribution network to two villages, and a parallel study of the supply and distribution network by DWAF investigating the widespread problem of uncontrolled, informal connections. The Mohlala Water Project concerns reticulation from boreholes to standpipes in the village of Mohlala.

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<sup>9</sup> *Mvula Trust* is an independent funding agency operating a demand-responsive fund for community-managed water and sanitation projects in disadvantaged rural areas of South Africa. It works in close cooperation with government and non-government agencies in South Africa.

*Mgeni Catchment Management Plan Natal Province, South Africa (Umgeni Water) Assessment in Mgeni Catchment*

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The Mgeni Catchment is characterised by an interaction of competing land uses : modification and pollution of riparian environments in urban areas; and encroachment by crop cultivation, timber plantations, invasive vegetation species and livestock in rural areas of the catchment areas, affecting water quality and the flow regime of the aquatic environment.

Umgeni Water<sup>10</sup> is responsible for rural and peri-urban DWSS within a broader catchment management context. The assessment emphasised integrated water resource management (WRM), formulated under the Mgeni Catchment Management Plan (1993). The Plan addresses key components of WRM such as monitoring of water resources and land use activities; identification of stakeholders in the catchment; and definition of appropriate management strategies, including community-level participation. The case study assessment comprised consultation with key stakeholders in the catchment, such as agriculture and forestry agencies or conservation groups, including departments within Umgeni Water with fragmented and overlapping responsibilities regarding WRM.

*Rural Water Supply and Sanitation Project Lumbini Zone, Nepal (FINNIDA) Assessment in Gulmi and Kapilvastu districts*

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Lumbini Zone is located in the Western Development Region of Nepal. Since 1990 the Rural Water Supply and Sanitation Project (RWSSP) has assisted rural communities in improving rural water supply, sanitation, hygiene education and irrigation activities. The project works with Village Development Committees (VDC) in promoting Water User Committees to operate and maintain drinking water and irrigation schemes, and implement small-scale schemes.

The assessment was conducted in two areas that represent the breadth of RWSSP activities in Lumbini Zone, each with a distinctive geography and ethnic composition. Kharjyang VDC, Gulmi district, lies in the hill region where improvement of DWSS is prioritised, due to supply shortages. Banganga VDC in Kapilvastu district lies in the valley (terai) area where irrigation systems have priority due to an abundance of groundwater available for DWS.

*Integrated Watershed Development Project Bilaspur District, Madhya Pradesh, India Assessment in Tilaikundi and Gahania villages*

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The Integrated Watershed Management Project is being implemented under the Rajiv Gandhi Watershed Mission Guidelines. Under the guidelines, micro-watersheds form the unit of development, that approximate the size of a village. Principal concerns lie with water conservation due to declining water tables, safeguarding water quality, and improvement of livelihoods, using local-scale technologies and management capacities.

Two villages were chosen for the assessment, based on the micro-catchment scale of the development units. Tilaikundi and Gahania villages are characterised by low levels of socio-economic development; irrigation of paddy crops is the dominant water use and DWSS projects involve simple water supply techniques (handpumps and wells). Due to the micro-scale of the assessments interactions with competing users was not a feature of the assessment.

*Cambodia Water and Sanitation Programme Cambodia (CAREERE) Assessment in Battambang province*

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The project, initiated in 1992, aimed to provide basic services to returnees who had fled during the Khmer Rouge rule in the 1970s. In 1996 the second phase of the project stressed the need to develop the government's capacity to assist villages in identifying and solving their own water and sanitation problems. The programme focus is rural areas of four provinces in the north of Cambodia.

The assessment concentrated on activities at three levels : Phnom Penh Waterworks at the national level; Battambang Waterworks at the provincial level; and Panh Nha village. The primary source of water for

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<sup>10</sup> Umgeni Water is the largest water board in the province of Natal, with a mandate to support rural and peri-urban water supply and sanitation, primarily through bulk supply.

## Annex 1: Project Assessment Summaries

Battambang Town is the Sangke River, threatened by water quality problems due to sediment loading. In Panh Nha, water sources comprise local family or communal ponds, lacking the complex water use issues at the catchment scale. The assessment focuses on capacity-building of government institutions to decentralise DWSS management such as well rehabilitation, to the village level.

### *Rural Water Supply and Environmental Sanitation Project Maharashtra, India (DFID) Assessment study in Jalgaon and Nashik districts*

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Three DWS schemes to rural households are being implemented under the project : two schemes in Jalgaon district and one in Nashik district. The principal water source in Nashik district is Girna Dam, whereas the source in Jalgaon district is the Hatnur Dam and the River Tapi. The primary water supply sector is irrigation, with DWS forming only a fraction of supply, and the major dams under control of the irrigation sector. Water supply activities are undergoing a process of decentralisation, to Zilla Parishads at the district level, Panchayat Samiti at the block level, and Gram Panchayat at the village level. The various levels of management correspond to water sources, from dams and rivers to village ponds and groundwater sources such as tubewells. The assessment focused on analyses reflecting these institutional levels, with discussions and interviews with stakeholders in selected project villages and associated institutions and government agencies.

### *Community Drinking Water Treatment Project Tolima Department, Colombia (CINARA) Assessment in San Felipe*

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A Surveillance and Control Project targeting environmental health was developed in the wake of the Nevado del Ruiz volcano disaster with the assistance of the CINARA Institute. The project involved sanitation and water quality monitoring, in a catchment context of multiple water uses. A recent phase focuses on piloting water supply using unconventional treatment methods. The project involved construction of a multi-stage filtration plant for water treatment, appropriate for small and medium-sized communities, particularly in rural areas with poor infrastructure.

The assessment comprised the evaluation of a community where the drinking water treatment project was applied. San Felipe was selected as a model community, with local knowledge of its water quality problems, local institutional capacity for water supply improvements and accessibility for replication in adjacent communities. The assessment focused on a workshop for water resource institutions at multiple levels. This was supported by a field survey of residents within the water distribution network.

### *Rural Water Resource Management Gujarat, India (SEWA / DGIS) Assessment in Banaskantha district and wider Gujarat*

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Acute water shortages in Gujarat affects more than 70 percent of villages each year. This regional disparity in endowment, combined with a top-down water supply approach have led to an uneven distribution of water resources state-wide. Deep tubewell irrigation threatens water quality as well as water table levels. SEWA activities in rural WRM stem from its mandate of improving the economic and social conditions of the poorest communities in Gujarat, particularly women. The central focus of the SEWA approach is building local management capacities through involvement at every stage of the project cycle. SEWA initiatives are in collaboration with the Gujarat Water Supply and Sewerage Board that manages state DWS programmes.

The assessment covered three SEWA water projects in Gujarat : the Water Campaign that spanned nine districts; a pond project in Datrana village, Banaskantha; and a checkdam project in Piprala village, Banaskantha. Information gathering took the form of informal discussions in the villages, and local committee meetings and workshops.

## Annex 2: Synthesis Workshop Programme

Project 'Promising Water Resources Management Approaches in the Drinking Water Supply and Sanitation Sector'  
**Synthesis Workshop, 3 – 10 September 1997, The Hague, The Netherlands**  
 At the IRC International Water and Sanitation Centre

Tue 2/9	Arrival of participants
Wed 3/9 Morning	<ul style="list-style-type: none"> <li>• Opening and introduction of participants</li> <li>• Workshop objectives, programme and methodology, organisational matters, how to present outcomes at end of workshop</li> <li>• Introduction on how to present cases (posters)</li> </ul>
Afternoon	<ul style="list-style-type: none"> <li>• Preparation of posters by participants</li> <li>• Preparation of exhibition</li> <li>• Visit of exhibition</li> </ul>
Evening	<ul style="list-style-type: none"> <li>• Participants review own cases and one other case</li> </ul>
Thu 4/9 Morning	<ul style="list-style-type: none"> <li>• Analysis of types of cases documented (matrix)</li> <li>• Theme: Conservation, Efficiency and Allocation (principles 1, 2, 3)</li> <li>• Work groups (3) analyse lessons learned, assess awareness and adherence and formulate recommendations</li> </ul>
Afternoon	<ul style="list-style-type: none"> <li>• Plenary presentations and consolidation of work groups</li> <li>• Video of SEWA case (India) &amp; drinks with IRC staff</li> </ul>
Evening	<ul style="list-style-type: none"> <li>• Small group prepares end presentation of today's outcomes and other participants review and edit their own cases</li> </ul>
Fri 5/9 Morning	<ul style="list-style-type: none"> <li>• Theme: People and management (principles 4, 5, 6)</li> <li>• Work groups (3) analyse lessons learned, assess awareness and adherence and formulate recommendations</li> </ul>
Afternoon	<ul style="list-style-type: none"> <li>• Plenary presentations and consolidation of work groups</li> <li>• Presentation on Internet access to WRM information</li> </ul>
Evening	<ul style="list-style-type: none"> <li>• Small group prepares end presentation of today's outcomes and other participants review and edit own cases</li> </ul>
Sat 6/9	Not programmed
Sun 7/9	<ul style="list-style-type: none"> <li>• Visit of Water Authority Amsterdam Region</li> <li>• Visit NewMetropolis, Science and Technology Centre, in Amsterdam</li> </ul>
Mon 8/9 Morning	<ul style="list-style-type: none"> <li>• Theme: Capacity building and economic and social aspects of water (principles 7, 8)</li> <li>• Work groups (3) analyse lessons learned, assess awareness and adherence and formulate recommendations</li> </ul>
Afternoon	<ul style="list-style-type: none"> <li>• Reflection by Advisory Group members on experiences with adherence to principles</li> <li>• Consolidation: relevance of all principles, priority principles, pre-requisites</li> <li>• Video on WRM: "Troubled Water, water management in the next century"</li> </ul>
Evening	<ul style="list-style-type: none"> <li>• Small group prepares end presentation of today's outcomes and other participants review and edit own cases</li> </ul>

## Annex 2: Synthesis Workshop Programme

Tue 9/9 Morning	<ul style="list-style-type: none"> <li>• Reflection on experiences with participatory methodologies used during assessment and scope for applying these methods in a more systematic way (SWOT analysis)</li> <li>• Workgroups brainstorm on possible follow up activities (after WRMpp project)</li> <li>• Identification and agreements on follow up activities:               <ul style="list-style-type: none"> <li>• - Presentation of IRC's ideas on post WRMpp activities</li> <li>• - Documentation of WRMpp project and its outcomes</li> <li>• - Dissemination of outcomes (channels and information products)</li> </ul> </li> <li>• Plenary: action plan for follow up activities</li> <li>• Plenary: prepare final presentation for Wednesday afternoon</li> </ul>
Afternoon	
Evening	
Wed 10/9 Morning	<ul style="list-style-type: none"> <li>• Finalising documentation of workshop outcomes</li> <li>• Preparation of presentation of project outcomes by participants, ag, IRC staff</li> <li>• Evaluation of workshop and Review of WRMpp project</li> <li>• Presentation of outcomes of workshop and WRMpp project</li> <li>• Official closing of workshop</li> </ul>
Afternoon	
Thu 11/09	Departure of participants

### Annex 3: Results of Application of Methodology

CASE STUDY	LEVELS OF USE	METHODS USED	COMMENTS
Volta Region, Ghana	Community	Mapping, focus group, interview with key informants (sector representatives, e.g., farmers, fishermen, WATSAN members)	<u>Strengths:</u> high level of experience; community facilitates <u>Constraints:</u> expectations high; expected profit share; methods not respected at higher levels; and time constraint did not allow interview with most stakeholders at regional and national level.
Northern Province, Zambia	Community  District heads Provincial	Focus group, short play e.g., on source protection or the rain cycle, field visits, data analysis Focus group discussion, individual interview Questionnaire	<u>Strengths:</u> Feedback to community <u>Constraints:</u> Synchronising facilitators was difficult; rains were a constraint; time was a constraint for interviews and field visits; and some techniques such as pocket chart and mapping were planned but not used due to time factor.
Southern Province, Zambia	V-WASHE and village members and Department of Water Affairs, Kalomo  D-WASHE National	Household interview, community group meetings, transects, village mapping, key informant discussion  Workshop Workshop	<u>Strengths:</u> Two villages surveyed after the rainy season had a very high turnout. <u>Constraints:</u> Budget constraint reduced number of cases; time constraint meant questions had to be simplified, there was little time to translate to address all principles and there was a short training period; the assessment coincided with the farming season so low turn-out; impassable roads with bad weather; and no transport and finances specific to project, a logistical constraint.
Mpumalanga Province, South Africa	Often individual stakeholders	Questionnaire, discussions, meetings of community, and other key stakeholders committee members, farmers, schoolchildren)	<u>Strengths:</u> The structured interview resulted in lively debate and widespread participation. <u>Constraints:</u> Inexperienced fieldstaff; it was decided not to use PRA due to time requirement, from participants, and it was felt PRA methods distract from objective of exercise; translation of complex WRM principles.
Mgeni Catchment, South Africa	Regional, provincial	Meetings, interviews with key stakeholders and other departments within Umgeni Water	<u>Constraints:</u> Methods new; budget constraint for local level study and field work; time constraint for fieldwork to cover whole catchment and the quantitative questions e.g., % satisfaction amongst different water users; difficulty in motivation of high-level officials not in same field of work.

### Annex 3: Results of Application of Methodology

Lumbini Zone, Nepal	Community groups  District/national	Mapping, discussion, field visit, interview with key informants and user committee members, Venn diagram, matrices, pocket charts Group work / discussion between district committees	<b>Strengths:</b> Different methods used at different levels; active participation with methods, e.g., community mapping and group work.
Madhya Pradesh, India	Community	Mapping, Venn diagram, matrix ranking, interviews, focus group discussion	<b>Strengths:</b> Familiarity with many tools; interviews and discussions suited to illiterate people. <b>Constraints:</b> High illiteracy levels meant many methods could not be taught; case studies did not involve competing users, therefore, limitations to understanding of some principles.
Battambang, Cambodia	Community  Provincial government	Transect walks, focus group, mapping, talks with key informants and committee members, workshops Group discussion, interview with key ministry and department staff, field visit	<b>Constraints :</b> Methods are new; lack of confidence / interest in committee work; time constraint hindering full explanation of principles.
Maharashtra India	State	Meetings with community water committee members, focus group discussion with women, and women returning from fields, interviews	<b>Constraints :</b> Facilitators showed partiality; bias in leading group questions.
Tolima, Colombia	Multiple levels	Variety of CINARA methods : role play, basin maps, Venn Diagrams and workshops involving Water Board, Health Service, Agriculture and Education Department representatives.	<b>Strengths:</b> The same methods were used at multiple levels; techniques gave a richness of information from the variety of participants present; community facilitates.

**Annex 4: List of Participants**

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**Annex 4: List of Participants**

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PROJECT "WATER RESOURCES MANAGEMENT APPROACHES  
IN THE DRINKING WATER SUPPLY AND SANITATION SECTOR"

The Proposed Framework  
December 1996

**1. Introduction**

Mismanagement of water and land resources is putting human health and sustainable social and economical development at risk. Explosive growth of urban centres, unsustainable exploitation of natural resources, uncontrolled industrialisation, increasing water demand for food production, and expanding populations lacking proper environmental sanitation have led to progressive depletion and degradation of freshwater resources. Many of the problems in the drinking water supply and sanitation sector (DWSS Sector) are related to the improper management of water resources. To safeguard the sustainable supply of safe drinking water and entire watersheds, concerted action is needed on all fronts, including agriculture, forestry, industry, transport, urban and spatial planning, population planning, and electricity generation. To prevent further depletion and degradation of freshwater resources, a more holistic approach is being promoted, which is known as integrated water resources management (WRM).

Back in Mar del Plata, 1977, water resources management was globally discussed for the first time, but it was not until the early nineties that it was really put on the international agenda. A number of significant meetings was held, such as the 1990, New Delhi meeting, the 1991 Nordic Freshwater Initiative in Copenhagen, the 1992 Dublin meeting and the 1992 UNCED meeting in Rio de Janeiro, the 1994 Ministerial Conference in Noordwijk and the 1994 OECD/DAC Meeting in Paris. These meetings challenged existing sector-oriented management practices of water resources as being unsustainable from an economic and environmental perspective, and have set out a number of principles and recommendations for integrated water resources management.

In an attempt to give guidelines for the implementation of Chapter 18 from Agenda 21 (the action programme of the Rio de Janeiro Conference), the Noordwijk Ministerial Conference summarises key issues in integrated WRM on which international agreement has been reached, and gives an overview of the main WRM principles for the DWSS sector. The meeting among others concluded that "access to adequate water and sanitation is a basic need and the long-term objective in the DWSS sector therefore continues to be 'safe drinking water supply and sanitation for all'. However, access to water needs to be accompanied by an obligation to use water efficiently and to dispose wastes in an environmentally sound manner for the benefit of future generations. This is a precondition for substantial progress towards the common targets of health for all, poverty alleviation, environmental conservation and economic and human development. To achieve these goals, water and environmental sanitation programmes need to be tailored to the ability of the local environment to support them, to the local socio-economic and cultural conditions and needs of men, women and children, and to the availability of resources." (Ministerial Conference on Drinking Water and Environmental Sanitation, 1994)

**2. Objective and definition of integrated WRM**

The objective of integrated water resources development and management as defined in Box 1, is to ensure optimal and sustainable use of water resources for economic and social development, while protecting and improving the ecological value of the environment to the maximum possible extent (revised from DANIDA, 1991). Sustainability has been added because not only current interests should be taken into account, but also those of future generations.

Integrated water resources management is necessary to combat increasing water scarcity and pollution. This includes water conservation and reuse, water harvesting, and waste management. An appropriate mix of legislation, pricing policies and enforcement measures is essential to optimise water conservation and protection. (UNDP, 1991).

*Definition of Integrated Water Resources Development and Management*

Water resources means water in the broad sense as available for use and susceptible to human interventions. Water can be surface or groundwater, and is characterised by both quantity and quality.

Development and management cover all phases of resources planning, development, use and protection, i.e. assessment, planning, implementation, operation & maintenance, and monitoring & control. It includes both combined resource and supply management and demand management.

Integrated means development and management of water resources as regards both their use and protection, and considering all sectors and institutions which use and affect water resources (cross-sectoral integration).

*Nordic Freshwater Initiative (DANIDA, 1991).*

### **3. Project purpose and approach**

The aim of the UNDP/IRC project on promising WRM approaches is to clarify how internationally recognised WRM principles and recommendations can be implemented in the DWSS sector. This will be done by reviewing and documenting how DWSS projects have been able to integrate and apply these WRM principles, and what pitfalls they have had to overcome or changes they have had to make to them. Eight principles have been selected for the IRC/UNDP project on the basis of common thinking as reflected in important international meetings.

To achieve the objective, staff of 12 to 15 projects with a WSS focus will assess through a participatory approach the way in which they apply part or all of the selected key WRM principles in their project. In this review staff may also involve external facilitators and perhaps even persons to do the reporting.

Subsequently a joint review of the 12 to 15 project reports will be made in a meeting of the participants from the different projects in The Hague. This meeting will help to draw general conclusions about the applicability of these principles, will bring out important problem areas and bottlenecks, and will enable the identification of the most promising practices and experiences.

### **4. WRM principles selected for review**

In the following sections the WRM principles which have emerged at the international level are presented. The basic idea is that staff of each of the participating projects will review their project's experience on each of the principles concerned. In this sense these principles together form the framework of analysis for the IRC/UNDP project. Some of the principles have been narrowed somewhat to facilitate comparison. For each principle guiding questions (numbered) to focus the review, and indicators (marked with \* ) have been listed as formulated during the Preparatory Workshop. In describing and reviewing the experiences it is very important to focus on the process, the pitfalls encountered and the keys to success. Projects may not have applied all principles, which is very interesting as this may imply that they did not consider them important, or did not have the resources and the conditions to implement them. It may also imply that not all principles are required at the same time or may not be equally valid.

During the assessment of experiences made, projects may address related principles and questions that are only partially or not covered in this framework. Based on the assessment of experiences made a final review of the framework will be done during the Synthesis Workshop.

*Principle 1: Water source and catchment conservation and protection are essential*

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Environmental degradation of water resources may have an immediate and severe impact on the water supply situation of the users. It may result in inadequate performance of water supply systems because of pollution and siltage problems, or systems being abandoned because water sources drying up. This may have an effect on the health of the users but also may involve considerable economic losses. In Poland, for example, three-quarters of the river water is too contaminated even for industrial use. Agricultural output and productivity also decline because of environmental degradation resulting from poor drainage and irrigation practices. On the other hand there are people with marginal livelihoods who have very little option beyond 'unstainable' practises. Water source and catchment conservation and protection includes amongst others, soil and water conservation strategies, pollution control measures, and sound land use practises.

Guiding questions and example indicators for the review

1. Has water source and catchment protection been identified as a need presently or in the longer term? (Why? By whom? When? How?).
2. Are catchment areas negatively influenced by any activities?
  - *Is there a marked reduction in flow volume/water level over the last five to ten years (do users have to walk longer distances)?*
  - *Are floods occurring more frequently?*
  - *Is there a marked deterioration of water quality over the last five to ten years (turbidity level, chemical quality, taste appearance, increase in cost for water treatment)?*
3. What are the threats to water source and catchment area protection (water quality, water quantity, environmental degradation)?
4. What protection activities are being undertaken (livestock control, reforestation, land management), and by whom?
  - *Is the percentage of degraded land increasing over the last five to ten years?*
  - *percentage increase of livestock over 5 years*
  - *percentage increase in irrigation licenses / irrigated area*
  - *population growth in catchment area*

*Principle 2: Adequate water allocation needs to be agreed upon between stakeholders within a national framework*

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Water management is fragmented among sectors and institutions, with little regard to conflicts or complementary needs and benefits among social, economic and environmental objectives. There are multiple agencies for different water uses, for example irrigation, municipal water supply, rural water supply, energy production and transportation. Interactions between these different 'sectors' and water uses, although all forming part of the same system, are usually ignored. Furthermore in many countries where individual states and provinces have jurisdiction over water in their territory, the same water source will be developed without considering the impact on other states. Integrated WRM calls for holistic management of fresh water and integration of sectoral water plans and programmes within the framework of national economic and social policy (Serageldin, 1995b).

Domestic, industrial and agricultural supplies are often already competing for the same water resources and this tendency will increase in future. Thus better mechanisms are needed for an adequate and equitable allocation of water, taking into account economic as well as social concerns.

Guiding questions and example indicators for the review

1. Is sufficient water of required quality available to meet the demands of all water users?
  - *percentage of estimated water use by different sectors*
  - *estimated water use per sector /allocation per sector*

- *level of satisfaction of stakeholders with allocated volumes (no. of registered complaints, percentage of dissatisfied stakeholders)*
2. What water allocation mechanisms exist, who is consulted and who makes decisions?
    - *percentage of stakeholders represented in decision making (elected stakeholder representation, percentage of stakeholders who feel their voice is heard )*
    - *availability of water resource data*
    - *accessibility of information to all stakeholders (percentage of stakeholders who feel they do not have good access to information)*
  3. What legal framework and traditional practices for water resource allocation exists? Is it effective?
  4. Is there equity in water distribution? are existing distribution mechanisms effective? (do sectors/users get what has been agreed? How is this measured?)
    - *percentage of people with equal access to water supply (distance to source, number of supply hours)*
    - *percentage of people with equal access to irrigation water*

*Principle 3: Efficient water use is essential and often an important water source*

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Domestic water supply and irrigation systems often face major water losses. Leakage percentages may be over 50 percent in community water supply and over 70 percent in irrigation. Efficiency of water use should be optimal, minimising water losses during transport, storage and use. Reducing water loss involves aspects related to design, construction and operation and maintenance of systems, as well as users behaviour such as leaving taps open or not repairing them. Enhancing efficient water use may also include reuse and water saving measures such as growing of less water demanding crops, use of fees and charges to curb wasteful water use, and the use of cross-subsidies. Efficient water use can be regarded at system level but also at catchment level.

Guiding questions and example indicators for the review

1. Is inefficiency in water use identified as a problem? If yes, who perceives it as a problem, and why?
  - *percentage of persons in user groups identifying inefficient use as a problem (users, operators, agency staff, farmers)*
2. What inefficiencies have been identified?
  - *percentage of leakage in supply system*
  - *percentage of leaking/open taps*
  - *percentage of households using drinking water for cattle*
  - *percentage of traditional irrigated area*
  - *percentage of irrigated area with crops with high water requirement*
  - *percentage of persons in users groups adopting water saving measures (reuse in the households, repair leakage, reuse/waste minimisation in industry)*
3. What measures are undertaken for the effective & efficient use of water? Who is involved and who decides?
4. Are there measures which have been considered but not implemented? if not why not?

*Principle 4: Management needs to be taken care of at the lowest appropriate levels*

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In many countries there is a heavy dependence on centralised administration to develop, operate and maintain water systems. However, centralised (top down) approaches to water resources development and management have often proved inadequate to address local water management problems. While recognising the need for a central mechanism capable of protecting national economic and social interests, the role of central governments needs to change, to enable users, local institutions and the formal and informal private sectors to play a more direct role. The government needs to become a facilitator instead of a provider. The current trend towards decentralisation in many countries, although with a wide range of meanings, proves promising in this respect and may help to bring management of water resources to a lower level.

The most appropriate level of water resources management may range from the household level to the level of international river basin committees, depending on the issue at hand. The important point is that consultation, planning, decisions and actions concerning water resources management should be taken as close to the root of the problem as possible, i.e. at the lowest appropriate level, and that higher levels primarily should provide an enabling environment for decentralised and integrated management (DANIDA, 1991).

Guiding questions and example indicators for the review

1. Who manages water supply systems? How long have they managed systems?
  - *percentage of systems with functioning monitoring system*
  - *average and range of years of experience of management committees*
2. Who manages different water resources?
  - operational (day to day management of surface and groundwater)
  - strategic (policy, legal, planning)
    - *percentage of systems with functioning monitoring system*
    - *average and range of years of experience of management committees*
3. Is management currently taking place at the lowest appropriate /possible level? If yes, describe constraints in having management at one step lower level. If not, why not?
  - *percentage of management committees with clear task assignment*
  - *percentage of problems referred to higher level authorities (frequency and level of back-up support)*
  - *percentage of users/stakeholders satisfied with the management*
4. Does existing legislation facilitate this principle? Is legislation effective? If not what other appropriate arrangements exist?
5. What are the changes taking place regarding the levels at which water resources are being managed? What are the constraints if any?

*Principle 5: Involvement of all stakeholders is required*

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To ensure that water resources are developed and managed properly, it is important to involve all stakeholders as much as possible and desired, being the parties with a vested interest. This involves coordination and collaboration between different users groups (eg. the domestic users, the irrigation farmers, industry, recreationists, and persons who represent the environment which cannot speak for its own). These stakeholders should have a platform for decision making where they can voice their concerns and ideas, and can discuss and vote about measures to be taken and activities to be developed to manage the resource. The above implies that it is important that stakeholders have access to information and can play a true role in decision making, and if required are helped to make their case. In the WSS sector we see already a positive trend in which the idea of community participation, often still implying provision of physical labour, food and shelter, is changing towards community management, empowering communities to take things in hand and claim their role in decision making.

Guiding questions and example indicators for the review

3. Who are the stakeholders? Do they perceive themselves as stakeholders and as being actively involved?
  - *percentage of stakeholders perceiving themselves as being involved*
4. Do stakeholders wish to be actively involved in WRM?
  - *percentage of stakeholders requesting information*
  - *percentage of stakeholders who wish to be more actively involved (interesting to explore in what way they feel they can be involved)*
5. Who owns the water resources/ sources (at various levels)?
  - *percentage of stakeholders/stakeholder groups owning sources/water rights (some sources may directly infer ownership, such as spring capture, or wells, others may have local bylaws or customary rights attached)*
  - *no. of systems being constructed / no. handed to community/farmer cooperative*
6. What platforms/forums exist for decision making? Do they work effectively? Who takes the decisions?
  - *percentage of problems acted upon (for each forum)*
  - *percentage of decisions acted upon (for each forum)*
  - *percentage of stakeholders represented on one or more coordinating / decision making body*
  - *percentage of decision making platforms with a monitoring system in place*
7. What conflict management mechanisms are applied?
  - *number of conflicts resolved over a certain period or at different time of year, (also illustrate the total number of conflicts during this period.), for example; over life of project over last year, during dry season (period of major shortage), during wet season (period of surplus)*

*Principle 6: Striking a gender balance is needed as activities relate to different roles of men and women*

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Communities, organisations and groups involved in and/or benefiting from a project are not homogeneous and do not have the same interests. They differ in gender, economic and cultural background (e.g. religion, ethnicity, class), and these differences often imply different needs and perspectives, among others related to the use of water. This often has implications not only for the use of water supply facilities, but also for operation, maintenance and management. Particularly the tasks, responsibilities and therefore needs and interests between men and women can differ considerably, and projects have to take special measures, often particularly to involve women. In many traditional water resources management systems, women are managing water resources, which is often ignored by projects.

Guiding questions and example indicators for the review

1. How are gender differences if any, perceived at;
  - planning level ?
  - decision making level?
  - user level ?
    - *percentage of persons indicating need for gender differentiation (planners, decision makers and users)*
2. What are the differences in the degree of participation and influence over decision making by men and women?
  - *percentage of decisions making gender differentiation*
  - *percentage of stakeholder representatives that are women (at decision making forum)*



- *percentage of men and of women that are satisfied with the influence of their gender group in decision making*
  - *percentage of meetings timed to suit both men and women*
3. Do approaches promote equal participation and access to resources for both men and women?
- *percentage of gender specific activities (differentiate between men and women)*
4. If any, what are the gender sensitisation programmes at different levels?

*Principle 7: Capacity building is the key to sustainability*

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Effective integrated water resources management requires an enabling environment and conscious and competent actors. Education, skills development and capacity building are essential to promote this. Capacity building of the organisations involved in WRM is crucial both for the proper implementation of a project and for its subsequent sustainability. It consists of three basic elements, namely 1) creating an enabling environment with appropriate policy and legal framework, 2) institutional development including community participation, and 3) human resources development and strengthening of managerial systems (Alaerts et al., 1991).

Institutional capacity for water resources management should be developed when there is a clear demand. Institutional response will therefore vary from time to time and place to place (DANIDA, 1991).

Guiding questions and example indicators for the review

1. Is capacity building a part of project activities? If so what are the key capacity building initiatives at different levels?
  - *percentage of budget allocated for training or capacity building*
  - *percentage of persons who have received training through the programme / project at different levels (lower / middle/ top/ stakeholders representatives)*
2. Can capacity be developed at all levels? If not what are the constraints / reasons (legal, institutional, lack of resources etc.)?
  - *percentage of trained people utilising recently acquired skills (if not available you may use a proxy indicator such as number of systems properly maintained)*
3. Which techniques are / philosophy is used for capacity building?

*Principle 8: Water should be treated as having an economic and social value*

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Water is recognised to have both a social and economic value. On one hand, water is considered a social necessity and therefore a basic right for all. Everybody requires access to sufficient and safe water for drinking and other essential activities. On the other hand water also has an economic value. The supply of suitable water and the disposal of sewage has a cost, and systems can only be maintained when this cost is covered, either through donations, subsidies or by users contributions. When treating water as an economic commodity, optimum use should be made of market-based instruments, like the “user pays and the polluter pays” principles. The charging mechanisms that will be adopted must be appropriate and reflect local socio-cultural and economic conditions (DANIDA, 1991).

Making the concept of water as an economic commodity operational includes shifting emphasis from supply to demand management principles when dealing with water resources. However next to the economic efficiency dimension, water must also be considered as a social commodity to ensure that the basic needs for the poor segments of the populations of the developing world are satisfied.

Guiding questions and example indicators for the review

1. Do all users pay for water used?
  - *percentage of water users that pay for water (water supply, irrigation, industry)*
2. Is there a tariff system for different water users? If so describe the system.
3. Does the tariff system (or cost recovery system) meet the:
  - capital cost
  - O&M cost
  - replacement cost
    - *ratio income from tariffs and O&M cost*
4. Is there any cross subsidy system to enable poorer communities to receive water supply? if so how does it work? what level of supply serves poorer communities?
5. Is the financial system transparent ? if so, how is it transparent?
6. Do different water users feel the price of water is 'fair' ?
  - *percentage of users considering they pay a fair price*

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