PARTICIPATION IN INTEGRATED WATER RESOURCE MANAGEMENT (IWRM) IN SOUTH AFRICA
QUICK REFERENCE GUIDE

TT 258/06
WATER RESEARCH COMMISSSION

PARTICIPATORY GUIDELINES

ENVIRONMENTAL GUIDELINES

PLANNING & ECONOMIC GUIDELINES

Participation in Integrated Resource Management (IWRM) in South Africa
Quick Reference Guide

Prepared for the
Water Research Commission
by

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Introduction

South Africa's National Water Act of 1998 makes the management of any water resource a partnership between local water users, regional catchment managers, and the Department of Water Affairs and Forestry. The Act encourages communities to become actively involved in developing and managing their water resources.

The three volumes of guidelines summarised here are aimed at social practitioners who work with stakeholder communities. The guidelines help practitioners make participatory water resource management a reality. They introduce the necessary social tools and scientific knowledge to enable communities to participate as envisioned by the legislative framework.

The *Participatory Guidelines* is concerned with good Integrated Water Resource Management (IWRM) practice , applying the philosophy of participatory IWRM and describing methodologies and case studies for community participation. Good IWRM entails capacity building, networking and conflict resolution, all of which require consistent work over time. The practitioner's responsibility is to help participating stakeholders to become knowledgeable about catchment issues and to build well-organised groups who can sustain the IWRM work when the project comes to an end.

The *Environmental Guidelines* describes the legislative and ecological context within which IWRM practice takes place. It gives the reader/practitioner guidance in three ways – it outlines national policy for water resource protection, it describes the environmental principles that inform good catchment management and IWRM, and it lists some of the IWRM procedures and partnerships currently in operation

The *Planning and Economic Guidelines* presents tools and conceptual models for participatory financial planning and decision-making, and outlines the economics of IWRM. The tools allow project priorities to be quantified and rationally assessed. This is the first time that many of these tools have been introduced in South Africa, but they have been tried and tested elsewhere in the world and constitute international best practice.

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ACRONYMS

CF	Catchment Forum
CMA	Catchment Management Forum
DEAT	Department of Environmental Affairs and Tourism
DWAF	Department of Water Affairs and Forestry
EIA	Environmental Impact Assessment
IEM	Integrated Environmental Management
GAS	Goal Attainment Scaling
IWRM	Integrated Water Resource Management
NWA	National Water Act
PLA	Participatory Learning and Action
PRA	Participatory Rural Appraisal
RAAKS	Rapid (or Relaxed) Appraisal of Agricultural Knowledge Systems
RDM	Resource Directed Measures
RRA	Rapid Rural Appraisal
SA	Social Assessment
SEA	Strategic Environmental Assessment
WfW	Working for Water
WfWet	Working for Wetlands
WMA	Water Management Areas
WUA	Water User Association

The *IWRM Guidelines* are dedicated to

Hugo Maaren (1937-2002),

the WRC Research Manager for this project,
who played a key role in the development of the guidelines.

Participatory Guidelines by Nicole Motteux

Quick Reference Guide

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1 THE IWRM PROCESS

What is IWRM?

Integrated Water Resource Management brings together the concepts of sustainable use, water resource management, stakeholder participation and economic development to manage the water resources within a catchment. IWRM draws communities and government together to learn about, manage, monitor and evaluate water resources in ways that ensure sustainability and the upliftment of disadvantaged communities.

IWRM terms and concepts

Key terms and concepts such 'catchment', 'stakeholders', 'participation', 'capacity building' and 'partnerships' are explained within the IWRM context.

Case Study boxes:

- Consultation is not the same thing as participation
- Insight into partnerships
- Relationships between different interest groups
- The complexity of local knowledge
- Applying IWRM concepts in the Kat River Valley

Understanding the complexity of stakeholders' lives is a prerequisite for IWRM practitioners

The IWRM Project Cycle

The IWRM project cycle can be expressed as – preparation, awareness raising, group formation, implementation, and monitoring and evaluation. This can be expanded into a 9-step process as – planning, selection of areas, resource appraisal, relationship building, awareness and capacity building, problem solving, preparation, implementation, and monitoring.

2 THE PARTICIPATORY PRACTITIONER

The complex role of the IWRM practitioner requires a commitment to participatory practices and a good knowledge of integrated water resource management. The ability of the practitioner to build on-the-ground capacity is vital in achieving sustainable solutions.

The roles and responsibilities of the practitioner

The practitioner must be both leader and manager, with an overview of the project, the catchment and IWRM issues. Practitioners often have to play more than one role – researcher, facilitator, advocate, activist, or a combination of these and must be clear which role they are carrying out.

A Kat River Valley Catchment Forum representative explaining the social and environmental issues in his village

Case Study boxes:

- The practitioner's role in empowerment
- Avoid the trap of 'political correctness'
- Learn to see the individual in your research
- Be clear about your motives

Living in the catchment

Living in the catchment can be a great advantage, allowing greater involvement and understanding between the practitioner and participating stakeholders. However practitioners who live in the catchment need to guard against creating unrealistic expectations and over-dependence among participating stakeholders.

Case Study boxes:
Routine situations can open up dialogue
An example of living in the catchment

The practitioner as project manager

A strong and clearly understood management structure is vital in participatory work, but management structures do not need to be hierarchical. In fact participatory IWRM works better with non-hierarchical structures. Management has to be adaptable and reliable.

Participatory and dominant frameworks

The participatory framework recommended in these guidelines actively encourages participating stakeholders to influence the choices affecting their lives, and to participate in IWRM implementation. By contrast, the dominant framework allows little or no active participation and IWRM activity is centrally planned. Key elements of the two frameworks are compared: the practitioner's relationship to learning and data collection, the project design, the project mode and context, and assumptions about life (ontology).

Case Study box: When 'participatory' is not participatory

Comparison of dominant and participatory philosophical orientations

The underlying philosophical assumptions behind the dominant and participatory approaches to IWRM are summarised in a table.

Case Study boxes:
My assumptions about the meaning of participatory had to change
Use of a survey: comparing dominant and participatory approaches

In the participatory framework, all aspects of people's lives are relevant, including their cultural practices

3 GETTING STARTED

The attitude of the practitioner

The IWRM practitioner needs to act professionally in all respects. The practitioner is not a philanthropist or a saviour, but the provider of a service, and needs to represent all participants equally. Participants have a right to development.

Case Study box: Use local knowledge to find the best support

Building a project overview

IWRM projects must adhere to the National Water Act, bearing in mind local institutional arrangements. The practitioner needs to understand the project area, stakeholder characteristics, the role of relevant organisations, and the project parameters and budget.

Working on a large scale

Time and budget limits make it difficult to consult and involve large numbers of residents and villages. There are ways to overcome this challenge, such as developing partnerships, identifying priority needs, decentralising operations, and building stakeholder capacity.

Case Study boxes:

- Committees need to be representative but manageable in size
- Electing community representatives
- Training in basic concepts
- You may need more than one approach to reach all stakeholders
- Combining activities saves time and money

Election process for a Community Forum in the Kat River Valley

4 GOALS, STRATEGY AND BUDGET

Setting goals and objectives

Clear goals and objectives are needed for all phases of a project – preparation, awareness-raising, group formation, implementation, and monitoring and evaluation. A common oversight is neglecting the implementation stage, or the monitoring and evaluation stages.

Case Study boxes:
Finances limit a project's objectives
How to include the broader policy context

Developing a strategy

An IWRM strategy describes the long-term direction, scope and impact of the project. Involvement of stakeholders is essential in the development of the strategy. The three key stages in strategy development are:

- Discuss with the stakeholder what the project is about
- With the stakeholder, link the project's goals, objectives and role to the longer-term stategic objectives
- With the stakeholders, translate strategic choices into achievalbe actions

Systematic participatory planning is necessary. This ensures that stakeholders are involved in IWRM, but also that water resources are sustainably managed in the long-term. Innovative practices should be used to get full stakeholder participation. The elements of participatory planning include dialogue with participating stakeholders, research and consultation, preparation of materials and drawing up a budget.

Case Study box: Sample IWRM workplan

Stakeholder preparing food for an IWRM workshop

Finances and resources

Project money is always for the stakeholders' long-term benefit, so financial information should be transparent and must be accessible to participating stakeholders. To be realistic about future sustainability, set up the project to operate with the same levels of resources that community stakeholders will have access to in the future. Participating stakeholders should not be paid to attend meetings and workshops, but should be compensated for transport costs.

The budget

This section provides a sample budget for an IWRM workshop and a 12-month full project budget. The full project budget includes human resources, general expenses, overhead costs, development production and distribution of communication materials, training of staff, subsistence and travel, pre-workshop capacity building, the costs of all workshops, and the costs of implementation of IWRM projects.

Case Study boxes:

Sample Budget for Environmental Workshop in the Kat River Valley
Budget format for a 12-month IWRM project
Costing a community water education project
Presenting financial information effectively
Sample Overview Sheet for Okhombe Landcare Project
A coaching approach helps people to learn about finances

5 LEADING THE PROJECT TEAM

An IWRM team consists of the practitioner, grassroots workers, administrative staff and specialist advisors. Success depends on the building of a cohesive and adaptable team whose members feel valued and supported. Team members who are given a comprehensive overview of a project will be better able to contribute effectively.

Setting up an office

The physical space for the IWRM offices should be well organised with clearly differentiated areas for specific activities. Good organisational systems need to be put in place, and should be easily understood and accessible to all.

Case Study box: Setting up a working space

The a local stakeholder team

Increasing the capacity of participating stakeholders is the way to ensure that a sustainable pool of skills and knowledge remains in the area once the project is completed. The grassroots team will be doing much of the on-the-ground workshop planning and communication. Team members should be carefully and transparently selected for their skills.

Case Study box: How local stakeholders were employed in Okhombe

Project staff and contracted experts

An IWRM project needs a competent and versatile administrative team to run the secretarial and financial aspects of the project. Specialist advisors will also be needed for particular tasks – environmental scientists, environmental educators, agriculturalists, lawyers, conflict negotiators, artists, actors, editors, cartographers and GIS specialists.

Case Study box: Use of outside experts has advantages and disadvantages

Leading the team

The project manager/practitioner should retain leadership of the project, because there are many pitfalls if outside agencies take inappropriate control. The leadership tasks of the project manager are to build a common vision, enable a culture of learning, troubleshoot and provide support.

Student journalist acts as a consultant to gather feedback about an environmental education programme

Case Study boxes:
- Leadership role hijacked by consultants
- Participatory style encourages independent initiative
- Team member rises to the challenge
- Employment opportunities should be fair
- The importance of a common vision
- Capacity building may be needed before people can participate

Managing yourself

As a practitioner be realistic about your own feelings, limitations and needs. The work is slow, complex and often fraught with setbacks, so accept support and guidance when needed. Know yourself, and do not take on too much.

A grassroots team member motivates children to produce environmental plays

Managing the team

Creating a shared team vision is vital in IWRM, with sharing of ideas between management and staff. The project manager has a responsibility to ensure that the actions of team members are always aligned with the needs of participating stakeholders.

Case Study boxes:
- IWRM team member takes initiative
- Balance management with freedom to take initiative

Staff training

Training is a major need in IWRM and should be viewed as an investment. Choose people who value self-development for training courses. Practitioners, grassroots teams, administrative teams and specialist advisors will all need different types of training programmes.

Case Study box: Team development – insights from the field

Managing staff conflict

The practitioner needs conflict management skills, including the ability to understand and mediate areas of conflict among staff. All approaches to conflict management should encourage team members to take greater responsibility. In cases where conflict has escalated out of control, the practitioner may need to call upon an outside mediator. Disciplinary procedures should be known and discussed by everyone on the staff.

Case Study boxes:

Select the right team in the first place
Absenteeism, alcoholism and male dominance
Sometimes it helps to let people learn the hard way

Networking

Networking is the building of relationships with relevant participating stakeholders – government, the water management institutions, and the private sector. The purpose of networking is to supplement the often limited IWRM resources and expertise through sharing resources, and drawing on the technology and knowledge of specialists.

Case Study boxes:

Recognise that DWAF is also a stakeholder
Dialogue is essential for co-operative decision-making

6 PARTICIPATORY METHODOLOGIES

Participatory methodologies are systems in which people are entitled to negotiate on their own behalf and change their own lives. All participatory methodologies should build skills and confidence among participating stakeholders so that they can sustain IWRM work. The essential participatory methodologies are:

Rapid Rural Appraisal (RRA)

Rapid Rural Appraisal is an information-gathering method for learning about local people and conditions. Although not entirely participatory in its information gathering methods, RRA is useful in some circumstances, especially if there is an urgent need for precise information.

Participatory Rural Appraisal (PRA)

Methods that involve local people in their own appraisal, analysis and planning. The methods use group exercises and interactive visual tools to facilitate information sharing and analysis. The conventional direction of learning is reversed in PRA – knowledge transferred from communities to the 'experts'.

A teacher from a rural school in the Mlazi River catchment involves learners in an environmental play

Action Research

Action Research takes place through a series of structured interactions, with each action being defined, planned, carried out, and reflected on. The method helps participants learn more about their modes of work, cultural and political differences, and power relationships.

Case Study box: The Action Research cycle

Rapid (or Relaxed) Appraisal of Agriculture Knowledge Systems (RAAKS)

RAAKS is an action-oriented method for participating stakeholder analysis and problem solving. It is a way of systematically monitoring and improving participating stakeholder performance. Participants gain an overview rather than seeing the project from a single perspective.

Case Study box: How RAAKS brings groups together

Other participatory methodologies

Three additional methodologies are Partnership Development, Participatory Learning and Action (PLA), and Social Assessment (SA).

Environmental education

Environmental education increases stakeholders' awareness of their environment so they can meet IWRM challenges responsibly. Environmental education makes use of participatory methodologies such as PRA, participatory theatre and Action Research. It must be linked with capacity building in decision-making and real IWRM tasks if it is to be effective.

Case Study boxes:
- Identify concerned teachers
- A multi-faceted environmental education programme
- Know the stakeholders and keep flexible

7 PARTICIPATORY TOOLS: CATCHMENT INFORMATION

This chapter (Participatory tools: catchment information) and the next chapter (Participatory tools: group dynamics) introduce a range of useful tools to get stakeholders involved in IWRM.

Catchment data review

A catchment data review allows both practitioners and participating stakeholders to increase their knowledge about the catchment area. This is achieved through gathering a range of data, from both primary and secondary sources, which is then compiled into an organised body of information describing various aspects of the catchment.

Case Study boxes:
- Update existing catchment data
- The many aspects of a catchment

Good observation informs practitioners about how stakeholders, such as this cabbage farmer, manage their resources

Surveys

Surveys use questions to gather all kinds of information, from population characteristics to background information about the catchment area. Questions are often open-ended and qualitative. The survey should be conducted sensitively and in a non-threatening way.

Case Study box: Generating and using participatory questionnaires

Semi-structured interviews

A semi-structured interview allows a free flow of conversation so that participating stakeholders can introduce topics they feel are important. The participants can lead the way and a series of 'why?' questions from the interviewer can help to reveal deeper causes.

Case Study box: How the relationship with the interviewee makes a difference

Visual mapping

Visual mapping, also called mental mapping, is the collective act of drawing a map with participating stakeholders. The process builds rapport, and the map can later be used to plan, implement and evaluate IWRM activities in the project area.

Case Study box: Mapping led to greater confidence

Mapping in practice

How to develop different types of maps with participating stakeholders, with useful interview questions to elicit information for inclusion on maps.

Case Study boxes:

Practitioners' comments about mapping

Struggles with a mapping exercise

Schoolchildren recording vegetation types at water collection points on a transect walk with a water quality scientist

Transect walks

In a transect walk, the participating stakeholders walk along a chosen route in the catchment discussing aspects that impact on water resources, such as soil conditions, land use patterns, irrigation, landslides and gullies.

Case Study boxes:
- Transect walks provide a wealth of knowledge
- Example of a transect diagram displaying different zones
- Practitioners' comments about transect walks

Transect tours

A transect tour is a learning trip through a catchment by vehicle. Participants get the chance to observe the whole catchment while discussing their concerns and generating ideas for better water resource management.

Case Study boxes:
- Transect tours – Kat River Valley
- Transect tour – Taaibosspruit, a tributary of the Vaal River

Seasonal diagram

A seasonal diagram shows the influences of seasonal changes on households, communities and the catchment over the course of a year. The diagram can include the distribution of rainfall, the reliability of water sources, the planting and harvesting of crops, and the availability and demand for labour.

Case Study box: Example of a seasonal diagram

Time trend analysis

A time trend analysis helps participating stakeholders to see how, over a period of some years, their actions affect the water resources and the environment. A timeline is drawn, which records major events, and gives approximate dates for each event.

Scientist and a knowledgeable stakeholder working together to record riparian vegetation

Case Study boxes:
How a timeline gives a broader perspective on IWRM
The importance of getting everyone's perspective
A solution to forgotten dates
Time trend example: Four decades of land use in Gwabeni

Observation

Observation means becoming aware of all aspects of local situations through living with stakeholders, engaging in informal interaction and attending social functions. Observation is useful throughout a project and should be used with other tools to enrich data.

8 PARTICIPATORY TOOLS: GROUP DYNAMICS

The tools described in this chapter are useful in building cohesive groups and in collectively working towards IWRM aims.

Small group dynamics

Knowledge of techniques for use in small groups is useful in IWRM work, especially in workshops with a large number of participants. These techniques allow quiet, less dominant members a chance to express their views.

Farmers in the Kat River Valley brainstorming their use of water resources

Case Study box: Small groups visualise their catchment in the future

Brainstorming

Brainstorming is a way to generate new ideas quickly, usually in a large group. It allows ideas to flow freely, gives all participants a voice, and often creates lively debate.

Case Study box: Stakeholders see their concerns reflected in action

Dialogue

Dialogue is by definition a two-way process. Those involved, including the practitioner, can express their views and needs.

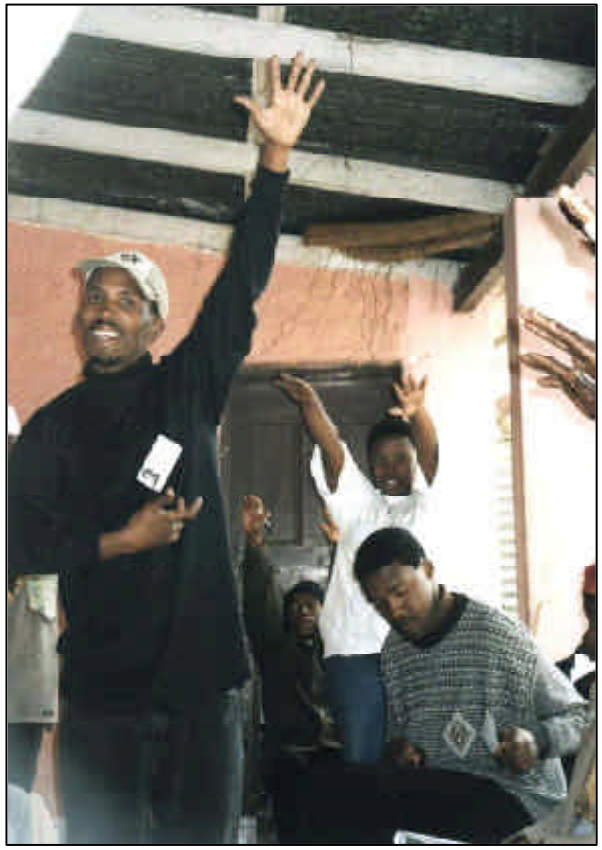
Case Study boxes:
- What is really being said?
- Formal dialogue builds consensus at an international conference

Discussing visual images

In this method the practitioner uses carefully selected photographs or other pictures to stimulate thought and dialogue about IWRM issues.

Case Study box: Using 3D visualisation techniques

After a workshop lunch, an exercise stimulates and focuses participants



Village meetings

Village meetings bring different groups of people together to discuss the project, gain information and get feedback. It is important not to raise unrealistic expectations, but also not to be closed to new possibilities.

Case Study box: Managing stakeholder expectations

Workshops

Participatory workshops are structured group meetings, which require careful planning in both their organisation and their purpose. Workshops should be well managed and adhere to an agenda. All discussion should be treated with seriousness and respect.

Case Study boxes:
- Do not assume that stakeholders will automatically interact
- A successful workshop series in the Inkomati area

Assigning tasks

Assigning practical tasks to participating stakeholders builds their confidence, skills and feeling of ownership for the project. Tasks that can typically be delegated include arranging a venue, selecting participants for a workshop, preparing food, drawing a map, or collecting information.

Case Study box: Planting trees together

Voting

Voting is used to elect representatives, reach consensus, or to enable participating stakeholders to establish their priorities (actions, values, needs, threats). It prevents conflict, since the results are clear and transparent.

Case Study boxes:
- Voting with 'money'
- Voting to establish priority concerns

Performance theatre – an actor illustrating how stakeholders can have a say in IWRM

Use of drama

Drama can be used in IWRM to raise awareness, transfer information, give local stakeholders a voice, find strategies and alternatives, break the ice, encourage two-way communication, and set the scene. Methods described include warm-ups, forum theatre, image theatre, performance theatre, play making and storytelling.

Forum theatre

Forum theatre uses professional actors, (or stakeholders who have been trained in acting) to portray a situation or problem that has to be solved in a community.

Case Study boxes:
- Forum theatre improves staff relationships
- Forum theatre gave a voice to the environment

Performance theatre

Performance theatre is the traditional form of stage performance by actors. After the play, the audience can discuss the ideas portrayed. Performance theatre works well when exploring situations or new ideas and concepts with large gatherings.

Case Study box: Combining theatre with visual mapping

Play making

Play making is the collective creation of a play by stakeholders. It is empowering both in its process and in the presentation of the final product – the performance.

Case Study box: Several dramas developed together

Image theatre

This is a good form of theatre to use for exploring issues that are difficult for people to verbalise. It makes use of image-forming movements of the body.

Case Study box: Using image theatre for IWRM

Storytelling

Storytelling is a means to entertain and pass on cultural messages. It is a useful way of exploring difficult, unpopular, or embarrassing issues in an impersonal way.

Case Study box: Using a story to affirm local knowledge

Warm-ups

Warm-up exercises relax and energise people in preparation for action.

Case Study boxes:
- Drawing together through song and prayer
- A cool warm-up idea
- The value of icebreakers

An actress playing the role of a farmer who misuses the environment. Stakeholders in the audience actively participate, advising her to take a more sustainable approach

9 POVERTY AND GENDER ANALYSIS

Challenging poverty with IWRM

Poverty reduction, as one of the objectives of the National Water Act, should be inherent in any IWRM strategy. Because poverty has many causes, it is one of the biggest challenges facing practitioners. Poverty reduction is most needed in remote and under-serviced areas.

This woman said she was nervous to collect water alone because criminals hide in the reeds

Defining poverty

Poverty is not just lack of income. It is a combination of risk, vulnerability, and social and economic exclusion. Four different ways to define and understand poverty are presented: domestic policy management; political culture and governance; lack of resources, debt and structural adjustment; population growth, climate and resources.

Initial IWRM poverty analysis

This poverty analysis allows the practitioner to devise an IWRM intervention that responds to poverty issues within the catchment. The practitioner gains an understanding of the spread of poverty in the area; the effects of macroeconomic policies; and the effectiveness of government programmes and institutions in reducing poverty.

Chart: Sample questions to use in a poverty assessment

The sustainable livelihoods approach

This more recent approach to poverty takes into account all the capabilities, assets and activities required for a means of living. The approach allows a broader understanding of poverty than income-based or needs-based interpretations as it focuses on people's livelihood strategies rather than on resources.

Case Study boxes:

Sustaining a Tanzanian village

Support existing initiatives before exploring new ventures

The Asian Development Bank Poverty Reduction Strategy

The Asian Development Bank identifies three pillars for a poverty reduction framework: sustainable pro-poor economic growth, social development, and good governance. This section describes three tools to reduce poverty: extending opportunities to poor and excluded groups; empowering poor and excluded groups; and reducing the vulnerability of the poor.

Gender analysis

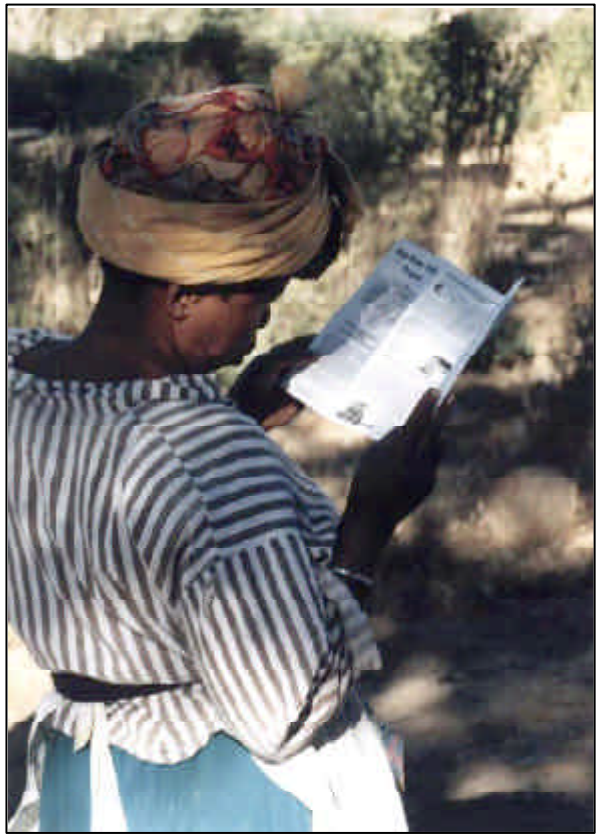
Inherent in the practitioner's job is an obligation to help people see the implications of gender bias for community development and IWRM. Designing and implementing development programmes means making women's and men's different concerns an integral part of the process.

Gender frameworks and tools

The merits and limitations of four frameworks to increase gender awareness and empower women are described: the Harvard Analytical Framework, the Moser Framework, the Gender Analysis Matrix, and the Gender Performance Indicator for Irrigation.

Case Study box: The majority of farm decision-makers in South Africa are women

A brochure was distributed in the Kat River Valley inviting stakeholders to participate in an IWRM project



10 COMMUNICATION STRATEGIES

A communication strategy, whether at village, catchment, or national level, is a well-planned campaign with a definite purpose in mind. The target groups are identified, the best tools to reach the different groups are chosen, and the sequence and timing of messages is planned.

Case Study boxes:

Communication to get participation in an ecological survey

Public hearings as part of a community strategy

Identifying the audience

Knowledge of the target audience helps the practitioner to choose the most suitable communication methods. An audience can be defined by demographic characteristics, or by the extent to which a particular issue affects a group. A list of useful questions to help define the audience is given.

Case Study boxes:
Tailor information to suit different groups
Communication strategy for an Eastern Cape catchment area
Using radio with print back-up

Kat River Valley stakeholders watch a video on how good farming pratices contribute to river health

Generating communication material with stakeholders

A checklist of key elements to consider when generating any kind of communication material with participating stakeholders is given.

Developing the message

Messages should not be confusing. Each message must fit in with the project's communication campaign and serve a particular purpose. Tips are listed on what to consider when preparing a message.

Drafting communication materials

A message can be drafted and clarified in four stages: data, message, image, and text/audio.

Case study box: Developing a message about the role of local government in IWRM

Radio materials

Radio programmes addressing IWRM issues can take the form of interviews, dramas or interactive discussions. Practitioners can prepare their own material for short (30 second) radio slots. It is better to brief professionals for longer slots.

Chart: Radio script for IWRM

Video materials

Producing video material is more complex than radio and is best done by a specialist. The practitioner's role is to prepare a very clear briefing document. This is outlined in three steps.

Chart: Sample video script

Computer-based materials

Computer-based materials can be anything from electronic versions of pamphlets, radio spots or videos, to interactive decision-making programmes. The advantages and disadvantages of computer-based media are listed.

Pre-testing and revising draft communication materials

All draft material should be pre-tested with people from the target audience to ensure that the responses are useful. Practical tips are given on how to pre-test material and analyse the responses.

Chart: Sample pre-test data sheets for both individual and group testing

Distributing communication materials

In any communication campaign, a good distribution plan is essential to ensure that the communication actually reaches stakeholders. Distribution methods include hand delivery, distribution chains, or distribution through the media. The distribution method selected depends on the target audience.

Radio and television distribution

Tips on how to get the best value from communicating via radio or television.

Evaluating communication material

Some points on how to make sure that communication material reaches the right target group, has an impact, and elicits the desired response.

A stakeholder involved in an exercise to pre-test draft communication materials

11 PARTICIPATING IN IWRM DECISION-MAKING

Each IWRM initiative needs a specific type of participation from participating stakeholders. For example determining water allocations and flows requires different levels of input and skills from participating stakeholders compared to, say, creating a Water Users Association.

Case Study box: Co-operative river research in the Kat River Valley

Overcoming barriers to participation

Because many things get in the way of participation in IWRM decision-making, the barriers need to be identified and overcome. A six-step process to a collective awareness of IWRM is presented here.

Case Study box: Broadening stakeholder perspective through drama

Sensitivity to women's workload is crucial when scheduling IWRM meetings

Linking to the broader context

It is important to link local needs with the broader context, especially the catchment-scale context. All levels of IWRM should be borne in mind at all times: the individual level, the stakeholder group level, the institutional level, and the wider society level.

Stakeholders' capacity to participate

Participation in formal institutions is not a common practice in most stakeholders' day-to-day lives. Obstacles to stakeholder involvement include gender bias, physical distance, communication difficulties and timing problems.

Case Study boxes:

How to ensure that meetings are representative

Insufficient stakeholder preparation spells failure

Forming representative groups

Questions to ask yourself to monitor the level of participation of all groups and ensure that IWRM is inclusive and meaningful.

Case Study box: Holding stakeholder representatives responsible

Creating Water User Associations and Catchment Forums

To set up local IWRM institutions - Water User Associations (WUAs) and Catchment Forums (CFs) - water users have to first be organised into functioning groups, which can then elect committee representatives. Generally the practitioner acts as a catalyst, working through existing organisations, and using a variety of methods to bring participating stakeholders together.

Case Study boxes:

Draw on expertise within the catchment

Clarifying project parameters with stakeholders

Incentives for stakeholders to participate

Generally stakeholders will not participate unless they think it is in their interests to do so. Think about what motivates stakeholders to participate in IWRM. Do not raise false expectations about what a project can and cannot deliver.

Case Study box: Broadening the CF vision led to more participation

Practitioner outlines the legal and funding limitations of an IWRM project to stakeholders

12 CAPACITY BUILDING

The key to sustainable IWRM

Capacity building is the key to sustainable IWRM. It is any formal or informal engagement or activity that builds participating stakeholders' confidence, vision and skills so that they are better equipped to fulfil the goals of a project. Capacity building activities can be both independent training programmes or an integral part of the IWRM programme. The best way to build capacity is to involve participating stakeholders directly in analysing problems and carrying out the required tasks.

Capacity building entails involving stakeholders directly in analysing their problems

Differences and trust

Capacity building should enhance people's ability to accept differences, without being discriminatory. The practitioner has to create a safe environment in which confidence can gradually be built, and where mistakes are tolerated as a means to 'learning-by-doing'.

Case Study box: Family financial tensions reflect broader cultural complexity

Internal transformation

Internal transformation is the building of self-esteem in a group. For example a problem such as litter may have underlying causes of lack of self-esteem in a community.

Case Study boxes:
Internal transformation is the foundation
Use an obvious problem to explore underlying issues

External transformation

External transformation means building the ability of participating stakeholders to take responsibility through making sure they have the knowledge and confidence to carry out tasks and make independent decisions.

Case Study boxes:
- CF representatives need skills and support
- Stakeholders adopt a proactive approach to building an understanding of IWRM
- Pre-workshop preparation
- Stakeholders take the reins of responsibility

Integration and working partnerships

The formation of working partnerships is necessary in IWRM. This means finding ways to bridge all rifts including those between factions, races, sexes, age groups, villages, farms and urban settlements. This can be achieved by bringing divergent groups together for meetings and activities.

Case Study boxes:
- Finding a working relationship with developers
- Integration through common needs

Who represents the people?

It pays to find out as much as possible about the official and unofficial role of leaders in the catchment area. This will allow practitioners to engage realistically in IWRM activities. Beware of following of 'false' or self-appointed leaders.

Case Study boxes:
- Taking sides is a mistake
- Working with traditional structures

Celebrating achievement

Affirmation and celebration of achievements at regular intervals helps to keep participants motivated and focused. Celebratory events help to draw catchment groups together and can be used for reflection and assessment purposes.

Case Study box: A workshop to reflect on a partnership

Kat River Valley children were included in a litter programme organised by a commercial farmer in conjunction with the local tourism board

IWRM includes broader concerns

The practitioner may need to balance specifically IWRM concerns with other social needs, such as HIV/AIDS support. The practitioner may be torn between following a focused IWRM brief, or diversifying into other areas that impact on IWRM delivery.

Case Study box: Going beyond 'pure' IWRM issues

Building capacity for knowledge

Capacity building needs to ensure that stakeholders can make informed decisions. Relevant IWRM information should be made available, to build people's capacity to absorb information, and to articulate needs. IWRM concepts should be internalised to the point that they become common knowledge.

Case Study boxes:
Overcoming timidity in meetings
Keeping people informed with a newsletter

Creativity helps build capacity

Creative engagement helps participants relax, get to know each other, and communicate their real needs and feelings. Practitioners should be clear on the purpose of a creative exercise, but at the same time allow the group enough room for creative improvisation.

Creativity in practice – a play about pollution and waste management

Case Study box: Two examples of creative methods that worked

Capacity building for implementation

As the project moves into implementation, capacity building must be linked to the skills needed to carry out and sustain the project. A detailed capability analysis is the first step towards building the necessary skills and knowledge. The participating stakeholders in the Catchment Management Agency (CMA), WUA and CF all have specific roles to play here.

Case Study box: Structure capacity building carefully

Computer skills

Appropriate information technology skills improve the capacity of participating stakeholders, especially those who are marginalised, to perform IWRM tasks and participate with confidence. The steps in running a basic word processing course are outlined.

Case Study box:
A proactive approach to building computer skills
How poor farmers can use the Internet

Practical training courses

To ensure that implementation is sustainable, participating stakeholders may need thorough training. An example is given, where stakeholders identified forest logging as the cause of soil erosion and increased sedimentation in a river. Specific training was required for the community to improve the natural environment.

Case Study box: Training blacksmiths in Tanzania

Strengthening local government capacity

A major objective of IWRM is to improve the capacity of local government to provide quality IWRM services to its constituents. Areas where capacity can be strengthened and enhanced are: familiarity with the IWRM process, ability to enforce IWRM legislation, and ability to interact with local communities and agencies.

Stakeholder farmers and scientists monitor how tree planting and improved farming techniques have affected the water resources

13 THE STAGES OF GROUP GROWTH

Stakeholders' abilities to participate in IWRM evolve from awareness, to learning, to sharing, to forming sustainable structures, and finally to becoming co-investors in those structures. These phases are incorporated in three broad stages.

Stage 1 – Awareness building

IWRM awareness building involves finding out about social realities, physical constraints and opportunities, and the legal structures governing IWRM actions. Typically in this phase participating stakeholders start organising themselves into groups, but they remain highly dependent on outsiders and the practitioner for structure and direction.

Case Study boxes:

- Building awareness for creating a WUA
- Stakeholders cannot participate without background knowledge
- Checking the level of understanding among stakeholders
- Getting an overview of the catchment

Stage 2 – Development of group growth

In this phase members of the group learn to negotiate, build partnerships, resolve conflict and deal with differences. The practitioner can support participating stakeholders by tailoring strategies to their specific needs, and by withdrawing from the leadership role as participants step in to a greater degree.

Case Study boxes:

- Active partnership formation
- Group formation: Mpumalanga Environmental Forum
- Building independence and a solid skills base in Okhombe
- Developing a stakeholders' code of conduct

Reporting back to Fairbairn village after a WUA meeting

Stage 3 – Stakeholder maturity

By this stage participating stakeholders achieve a high level of co-operation in setting up basic structures. They begin identifying with the broader needs of the community, the environment and the catchment. They will already be participating in social, political and financial matters on a broad scale.

Case Study boxes:
- The mature group
- Proving capacity – a stakeholder's perspective

14 MANAGING CONFLICT

Conflict over water issues is an inescapable reality, especially in farming communities where water is a vital ingredient in people's livelihoods. The Circle of Conflict diagram shows the different causes of conflict. Participating stakeholders need to be given space to express their feelings and wishes, and then encouraged to work towards the long-term benefit of the entire community.

Case Study boxes:
- Dealing with stakeholder vulnerability
- Potential conflict in IWRM

Approaches to conflict management and dispute resolution

The practitioner working in dispute resolution needs to consider factors such as timing, expense, confidentiality, and the need to maintain relationships. The basic steps in conflict resolution are: identify the problem, identify those involved in the problem, identify the needs, wants, interests and perspectives of the parts, and create options for resolution. The methods of conflict resolution described are: communicating, negotiating, mediation through facilitation, appeal to the Water Tribunal, and litigation.

Facilitators working with stakeholders to draw up their WUA constitution

Case Study boxes:
- Be aware of underlying imbalances in power
- Don't suppress the open expression of differences
- Work through the appropriate channels
- Using a mediator
- A realistic approach to mediation

Managing conflict locally

If conflict can be resolved locally within a catchment, it saves time and money and is empowering for all those involved. This section offers an 11-step approach to local conflict resolution.

Case Study boxes:
- Make space for informal discussions
- Creative approaches to conflict resolution

Catchment Forum members in the Inkomati Basin working on a framework for the formation of their CMA

Conflict and the practitioner

Practitioners need to be aware that their own actions and attitudes can exacerbate or be the direct cause of conflict. To resolve this they need to identify and admit to mistakes that they have made.

15 HANDING OVER

At the end of a contract the practitioner will either hand over to the participating stakeholders, or to another practitioner. The sustainability of the IWRM processes is a key measure of the project's success.

Case Study box: Project sustainability

Extending a project with a new practitioner

Outgoing practitioners have a responsibility to publicly notify all parties well in advance that their involvement is about to end. The practitioner will need to hand over information and contact details to the incoming person.

Handing over to stakeholders

To ensure that the project is sustainable it is necessary to have an exit strategy planned well in advance, which involves stakeholders.

Case Study boxes:

- Has the project achieved a common vision?
- Think ahead about an exit strategy
- Time and contact are the most crucial investments
- Give adequate time for stakeholder takeover

Completing a project

Formal project completion reports, as required by the project's financiers, should be prepared well in advance. The practitioner should have a succession plan in place before exiting.

Case Study box: The project report is not an afterthought

16 IN CONCLUSION ...

Good IWRM practice leads to sustainability, poor IWRM practice lessens the likelihood of sustainability. In summary, the principles for developing IWRM in a participatory manner are:

- IWRM projects need to have a long-term goal and cannot be driven by haphazard planning
- Professionalism is non-negotiable in IWRM projects
- IWRM is an evolution, not a revolution
- In IWRM conflict is inevitable
- To empower participating stakeholders to take responsibility, give them responsibility
- IWRM community structures, such as Catchment Forums, should be given responsibility for local decision-making and action

REFERENCES AND INFORMATION

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1 THE NATIONAL WATER ACT

The NWA: new challenges in water resource management

South Africa's National Water Act recognises that the country's water resource is a holistic, integrated system. The law sees the country's catchments and aquatic ecosystems as part of the wider resource base. It promotes the management of the water resource as a partnership between the Department of Water Affairs and Forestry (DWAF), regional catchment managers, and local users.

What is meant by the water resource?

The water resource is more than just the water itself. It includes the natural channel through which the water flows as well as its ecosystem. The National Water Act (NWA) introduces the concept of resource quality. To have healthy aquatic ecosystems, we need to protect and manage their four critical aspects (1) water quantity, (2) water quality, (3) habitat condition, (4) the condition of the biota (the aquatic plants and animals). Each of these four aspects is the subject of a chapter in these guidelines – see chapters 4-7.

Resource Directed Measures

Resource Directed Measures (RDM) are the regulatory tools designed to balance the protection of each water resource and its use by people. For each water resource, the RDM determines (1) the resource class (2) the Reserve (3) the resource quality objectives. The Reserve is the primary tool for protecting water resources in South Africa. For every

Facilitator explaining the concept of the Reserve at a stakeholders' workshop

river or body of water, it has two components – the basic human needs Reserve, and the ecological Reserve. No licences to use water in a water resource may be issued until the Reserve has been determined and its water requirements set aside.

Source Directed Controls

Source Directed Controls are the regulatory tools that are used to manage and control impacts arising from the catchment which affect the four components of water resource quality. Often these impacts are caused by land-based activities. Source Directed Measures include the authorisation of water use, the issuing of licences and the enforcing of environmental standards.

Resource class – what goods and services does each river offer?

The NWA recognises that a compromise always has to be made between taking water out of a river for human use and leaving water in the river for maintenance of ecosystem goods and services. The Act specifies that each river must be classified according to one of four management classes: *natural, good, fair* and *poor*. Each of these classes describes a different balance between the protection and the use of the water resource. Under the new water management strategy, stakeholders can and should take part in deciding the management class for their water resource.

Catchment for a small valley-bottom wetland in Featherstone Kloof, in the headwaters of the Kowie River

Case study box: The River Health Balloon Game, a teaching exercise that can be used in workshops. Participants act out the roles of different users and resource managers in order to decide the desired class of a river.

2 WATER MANAGEMENT INSTITUTIONS

Catchment Management Agencies

Catchment Management Agencies (CMAs) are the statutory bodies which manage each of the 19 Water Management Areas (WMAs) in the country. By early 2003 the only CMA that had been put in place was the Imkomati CMA. Each CMA's task is to develop a catchment management strategy and coordinate the functions of other institutions involved in water-related matters.

Water User Associations

Water User Associations are statutary local (usually sub-catchment based) institutions, often founded on an existing body such as an irrigation board. They are cooperative associations of individual water users who wish to undertake water-related activities for their mutual benefit. A WUA constitution must include all water users in the catchment area.

Catchment Forums

Catchment Forums are non-statutary local organisations for people living in a catchment who have common concerns. Their purpose is to protect the catchment's water resources at the local level.

3 WATER RESOURCES AND THE RIVER CATCHMENT

The catchment

This section defines and describes the catchment. An important task of the IWRM practitioner is to make stakeholders aware of the links between catchment and river, for example, water users in the upper catchment inevitably affect the quality and quantity of water downstream. The IWRM practitioner can play a key role in helping communities bring government departments together in a forum to solve local catchment management issues.

Case Study box: Participatory mapping in the Kat River

Participatory mapping in the Kat River – using aerial photographs

Water as a resource

Water resource managers have to manage water in the most sustainable way possible. This section looks at different kinds of water resource. Although we make a distinction between surface and groundwater, in reality the two are closely linked and should be treated as two parts of the same system.

Case Study box: Rainwater harvesting

4 RESOURCE QUALITY: QUANTITY, PATTERN, AND IN-STREAM FLOW

How much water? - the catchment water budget

In the long term, the amount of water leaving the catchment as stream-flow and evapotranspiration must equal the amount coming in as rainfall. This is the water budget. The water budget components for a number of catchments in South Africa are listed in a table.

Evaporation and water use by vegetation

Evaporation takes place in two distinct processes, direct evaporation and transpiration, with a further distinction being made between potential evapotranspiration and actual evapotranspiration. Evapotranspiration is greatest for tree stands and lower for grassland. A tall, fast-growing crop such as sugar cane uses a lot of water, but not as much as forestry plantations. The aim of the Working for Water Programme is to increase stream-flow through the removal of invasive alien vegetation.

Case Study box: Working for Water Programme and Stream Flow Reduction Activities

Sugarcane is both tall and fast growing, so it uses a lot of water

The pattern and timing of river flow

The flow of water in rivers varies between years, between seasons, and between rainfall events. This natural variation is necessary for many ecosystem processes, and should not be interfered with too much. Examples are given of three hydrographs, showing three different time scales for the Mkomazi River in KwaZulu-Natal – for one month, one year, and a 40 year period. The two main types of stream-flow are storm flow (surface runoff) and low flow (groundwater flow). Storm flow, the quick response to rainfall, reaches the river channel by way of surface pathways. Low flow, the delayed response to rainfall, travels to the channel through soil and groundwater. Water managers, who

want to reduce extreme flow variability, try to decrease the storm flow. This can be done by encouraging suitable vegetation cover such as forest, grassland, and wetlands, and by contour ploughing.

Social and ecological significance of flow variability

Low flows and floods affect people and aquatic ecosystems in different ways. Floods may be undesirable for people, but they are necessary to maintain resilient ecosystems. Bankfull floods, which happen every one or two years, create the channel shape, the pattern of meandering, and other morphological features.

Case study box: Flow variability workshop in the Kat River Valley

Landcare

Landcare is an approach to conservation and development that reduces water demand while improving agricultural productivity and water quality. The Landcare approach was developed in Australia, and the Australian government is helping to develop capacity for Landcare in South Africa within the provincial and national Departments of Agriculture. Several hundred Landcare projects are currently underway.

Case study box: *Rainwater Harvesting and the Mlazi River Catchment Programme*

Flow duration and flood frequency

Hydrologists commonly use two graphical techniques to summarise hydrological time series – flow duration curves and flood frequency curves. Flow duration curves illustrate the length of time for which flow is at, or above a specified level. They are especially useful for analysing low flows. Flood frequency curves estimate how often we can expect a flood of a certain size to occur. For example, a 50-year flood is likely to occur once in 50 years, on average. Examples are given for the Thukela river and the Kowie river.

To prevent the danger of flooding from an upstream dam a new higher bridge was built in 2002 near Fairbairn Village in the Kat River Valley

5 RESOURCE QUALITY: WATER QUALITY

What is water quality?

Water quality refers to the characteristics of water that make it suitable or less suitable to use. Any assessment of water quality therefore depends on what the water is being used for. DWAF offers a set of guidelines on how to assess water quality for a range of different purposes such as household use, agriculture, industry and recreation.

Components of water quality

The most important components of water quality are dissolved salts, nutrients, e-coli, pH, turbidity, dissolved oxygen, and temperature. The quantity of each of these components in a water body may vary due to both natural processes and human activity in the catchment.

Pollution

Urban settlements, industry, intensive agriculture, and concentrated rural settlements, are all big polluters. Pollution is harmful to domestic consumers and the river ecosystem itself. Point source pollution comes from the outflow from an identifiable point – a sewage works, a factory, a piggery or a dairy. Diffuse source pollution is closely related to land use, such as the leaching of chemicals or soil nutrients off farmland. To manage and regulate pollution we need to first monitor the extent of the pollution problem. A useful way to do this is by biomonitoring of river health. This method works on the principle that any significant deviations from natural quality will show up in the species composition and numbers, especially of invertebrates.

Waste and effluent in urban areas contributes to water pollution

6 RESOURCE QUALITY: HABITAT

The character and condition of the instream and riparian habitats can be assessed using the key variables of hydrology, water quality, and channel structure (morphology).

Channel structure

The physical shape (morphology) of the channel determines the width, depth and velocity of flow for any given discharge. The main variables determining channel structure are the size and frequency of flood events, the nature of sediments, the deposition environment, and riparian vegetation.

Downstream variation in channel structure

It is convenient to divide rivers into three zones with distinct characteristics related to changes in channel gradient, flow and sediment size – mountain streams, foothill streams and lowland rivers. A fourth category is gorges, which are common in the middle to lower reaches of many South African rivers. Wetlands and estuaries, two other important landscape components, are also described in this section.

Case study box: Working for Wetlands

7 RESOURCE QUALITY: LIVING ORGANISMS

The organisms in a river ecosystem have many functions. They are the food sources, they recycle the nutrients, they clean and purify the water by filtering it. Any loss of organisms (reduction in biodiversity) means that the number of services in the ecosystem is reduced. The ecosystem then becomes less able to adapt to changes in temperature, flow patterns and water chemistry.

A foothill stream in the middle reaches of the Mgeni River

Plants and algae

Plants and algae provide food, oxygen, and shelter for other organisms and perform important functions in nutrient cycling. Algae are simple plants that float in flowing water, or are attached to rocks and other surfaces. They prefer clear, slow-flowing water, where the sunlight can penetrate deeply. Plants that live in the riparian zone rely on regular flooding to supply water and nutrients.

Microbes

Microbes are the smallest organisms on earth, responsible for decomposing organic material into nutrients to be used again by other plants. They provide an essential food source for other animals.

Invertebrates

Invertebrates play an important role in rivers, especially in nutrient cycling, and as a food source for other animals. They use all the many habitats provided by rivers, from fast-flowing water with high oxygen levels, to slow-moving deep water with low oxygen levels. Each invertebrate's place in the river depends on its tolerance for conditions such as the flow of water and the substances dissolved in the water.

Vertebrates

Vertebrates include amphibians (like frogs), reptiles (like lizards and snakes), fish, birds and mammals. All vertebrates need specific habitats for their continued survival. Some live entirely in rivers while others may use the river for part of the time or part of their life cycle.

Case study box: The River Health Programme

The underside of river stones is a common habitat for invertebrates

APPENDIX 1

ENVIRONMENTAL PRACTICE: TOOLS AND PROCEDURES

The Department of Water Affairs and Forestry and the Department of Environmental Affairs and Tourism (DEAT) have developed a number of policies and associated legislation to promote sustainable environmental practice in support of IWRM. These procedures are described in this Appendix. They include Resource Directed Measures, Stream Flow Reduction Activities and Forestry Licences, Strategic Environmental Assessments and Integrated Environmental Management.

Resource Directed Measures and resource classification

The procedures for determining the Reserve for each water resource are specialised and detailed. They are published in the Government Gazette and updated at intervals as scientific knowledge improves. The procedures follow seven generic steps, which include establishing the current status of the water resource, consulting with stakeholders to arrive at a future desired state, setting the management class on this basis, then determining a quantitative Reserve and Resource Quality Objectives which will meet the requirements of the class. The technical procedures require input from scientists from several disciplines, including hydrology, ecology, geomorphology, social sciences and economics. All procedures for RDM determination follow the same basic seven-step approach. They can range from quick, low-confidence desktop methodologies, to intensive high-confidence methodologies requiring field studies and detailed analysis. A catchment community group can, through a Catchment Management Agency or Catchment Forum, initiate the process of RDM determination.

Stream Flow Reduction Activities and Forestry Licences

In the past, forestry was granted a simple allocation as a proportion of the water in a catchment or river system, after which all water was reserved for other users, with irrigation predominating. This procedure has, rightly, been questioned. The decision is now based on the benefits that the planned water use will provide to society and the economy. Landholders wanting to plant new forests, however small, must apply for a water use (Stream Flow Reduction Activity) licence. The applicant must prove that the site is suitable for forestry, and usually has to support the application with a soil survey and Environmental Impact Assessment. The licence application is assessed by the provincial Environmental Authority, the provincial office of the Department of Agriculture, and other members of the Licence Assessment Advisory Committee.

Integrated Environmental Management (IEM)

Integrated environmental management (IEM) is a policy to promote sustainable development and the equitable use of resources, to achieve a desirable balance between conservation and development. IEM is not to be confused with EIA (Environmental Impact Assessment) – IEM includes EIA, but only as one component of its process. The three stages in the IEM procedure are:

Stage 1 - Development and assessment of a proposal. This can take one of three routes: the No Formal Assessment route, the Initial Assessment route and the Impact Assessment route.

Stage 2 - Decision by the local office of the Department of Environmental Affairs and Tourism.

Stage 3 - Implementation.

Case study box: Example of an IEM report

Strategic Environmental Assessment

Strategic Environmental Assessment (SEA) is a relatively new tool, a proactive way of gathering and organising information. It differs from the more familiar Environmental Impact Assessment which is project-specific and does its best to make a planned project fit into the environment. An SEA gathers information at all levels, seeks to describe opportunities and constraints, deals with issues, and works with stakeholders. It seeks out information not often integrated into decision-making, such as the needs and visions

Commercial forestry activities use large quantities of water and therefore require licensing

of stakeholders, the true social and economic dynamics, and prospects for alternatives. SEA also makes this information publicly available, so that people affected can make choices and understand decisions.

APPENDIX 2

ENVIRONMENTAL PRACTICE: PROJECT PARTNERS

The River Health Programme

The River Health Programme is a collaborative venture to determine the state of health of the country's rivers at a national level. It is led by DWAF, with the Department of Environmental Affairs and Tourism and the Water Research Commission (WRC) as partner organisations. Implementation of the programme is carried out at a provincial level by a network of specialist implementers who work together. The RHP participates in community and school initiatives by organising talks, demonstrating river surveys, donating sampling nets for school projects, and making related literature available.

Working for Water

Working for Water (WfW) is a programme to clear alien vegetation on both public and private land, with the main focus being on public land. It gives priority to clearing land that has been allocated to disadvantaged communities or emerging farmers. In these cases the WfW covers the full cost of initial clearing. Limited assistance is given to clearing private land.

Case study box: How Working for Water tackled the urban Jukskei River

Working for Wetlands

Working for Wetlands (WfWet) is funded through the Working for Water programme and uses the DWAF administrative systems. Communities or individuals with an interest in wetland conservation and rehabilitation can submit proposals for rehabilitation projects. Project proposals are evaluated through a number of criteria, based on conservation, biodiversity, and hydrological importance.

APPENDIX 3

GLOSSARY: TALKING TO THE ENGINEER

Social practitioners concerned with IWRM need to talk to water engineers, to understand and explain aspects of development schemes to water users. This section explains terms commonly used by engineers to describe water resource development.

INFORMATION AND RESOURCES

School children collecting water insects for biomonitoring

Planning and Economic Guidelines
by John Fargher

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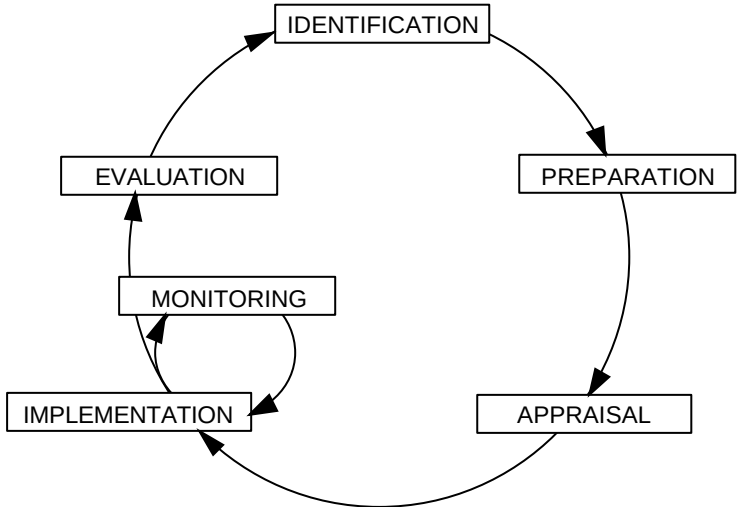
1 INVESTING IN WATER RESOURCE MANAGEMENT

Integrated Water Resource Management is an investment, because it commits scientific, human, and financial resources to the management of water resources. The investment cycle can be applied to water resource management at any scale, from broad strategic planning by a water management authority to a small riparian revegetation project by a Catchment Forum or village group.



The investment cycle

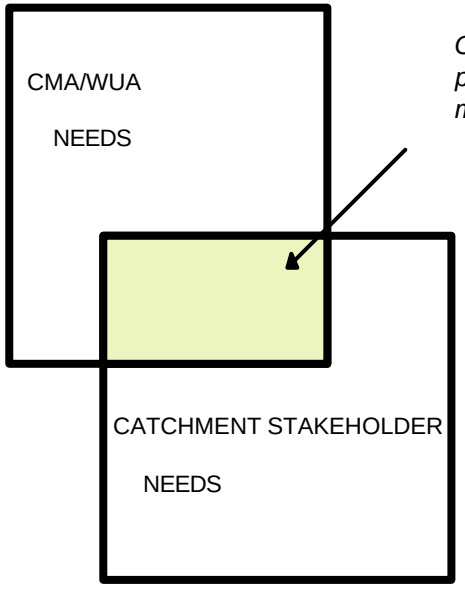
IWRM at different scales

At local and regional scale stakeholders can participate directly. However catchment and national scales are too large to involve all stakeholders. Here representative participation is necessary, together with processes to communicate with local stakeholders.

2 TOOLS TO IDENTIFY AND PREPARE IWRM INVESTMENTS

Identifying overlapping needs

Catchment activities must meet at least some of the needs of all stakeholders. Among other things, this gives stakeholders a strong incentive to participate. The relationship between the needs of the water management institution and the needs of the stakeholders can be shown as two boxes overlapping, with the shaded area representing the shared needs or overlapping interests.

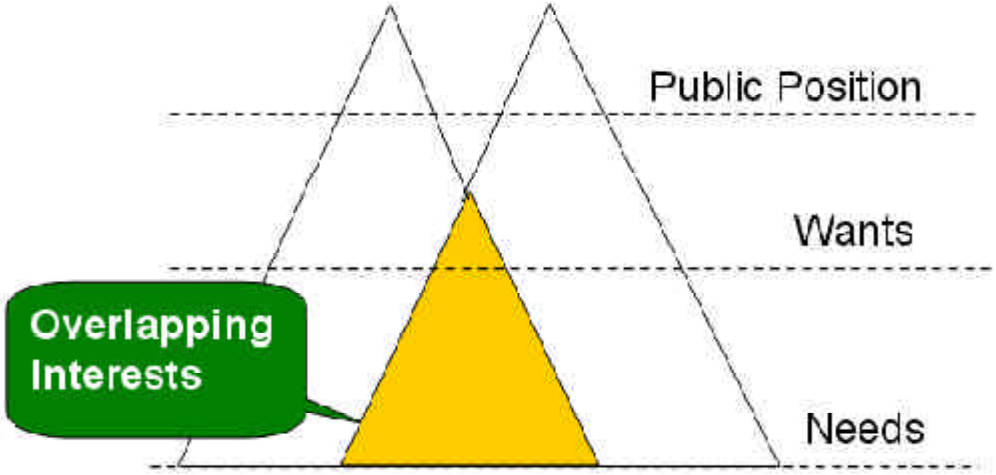


Overlapping interests: the starting point for participatory catchment management

Duties and priorities at catchment scale

It is important that water management institutions (CMAs, WUAs, DWAF) are clear about their own framework of interest before engaging with stakeholders. They will then be in a position to inform stakeholders more clearly about what is possible or not possible within the IWRM context.

Like all people stakeholders often confuse needs, which refer to what is necessary, and wants, which refer to what is desirable. There is nothing inherently wrong with wants, but they are normally not obtainable with the resources available. A focus on wants raises expectations that usually cannot be met.



This chart shows differences between two parties concerning their needs, wants, and public position. Here their public position is contentious (the peaks of the triangles show no common ground), and their wants do not overlap much. But their needs – the most important layer – have much in common.

The Problem Census – a tool to identify stakeholder priorities

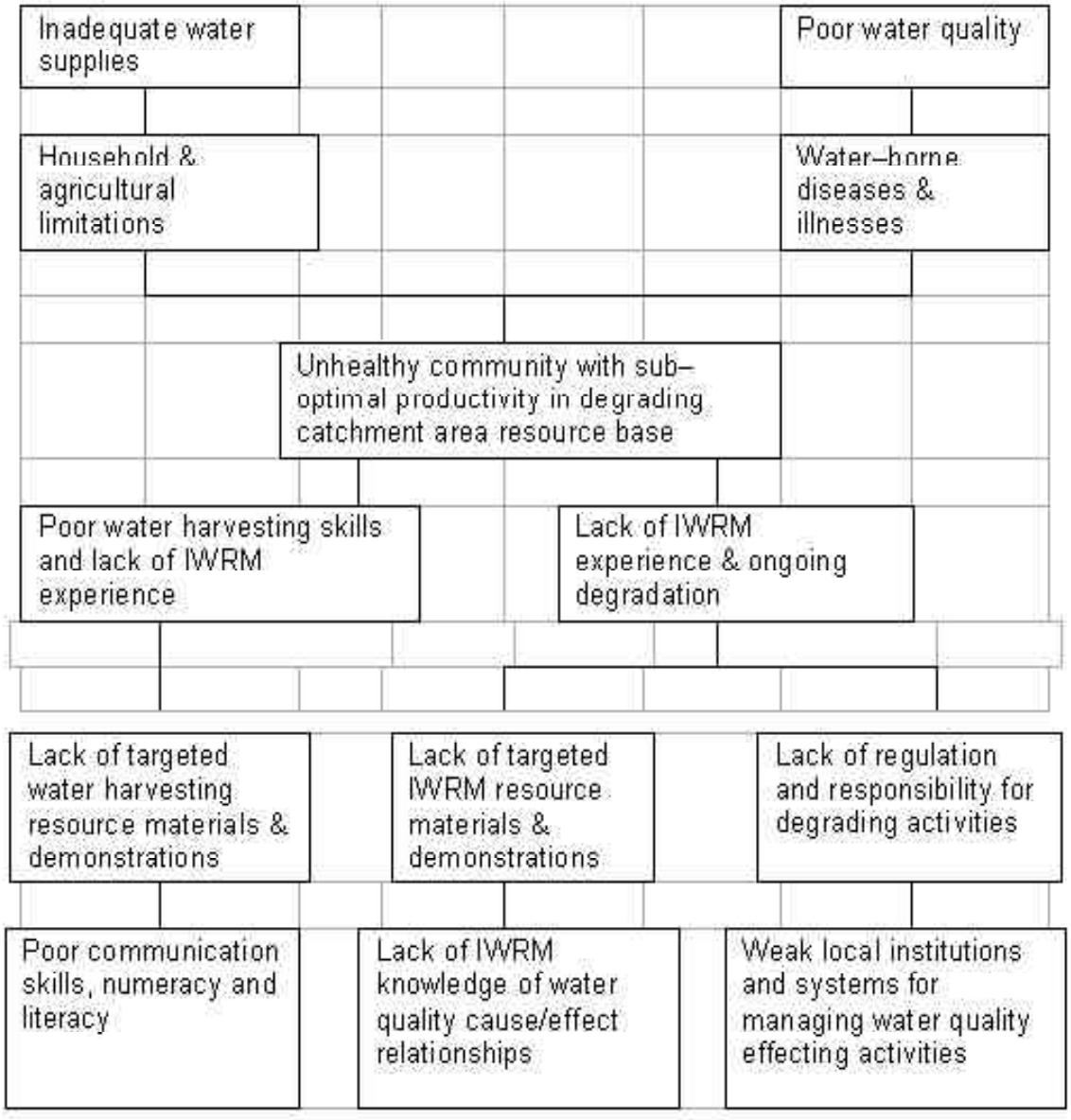
A common difficulty in IWRM is the dominance of self-appointed leaders and the reluctance of some people to participate actively in discussions. To make sure that all are heard, a tool called The Problem Census can be used, which enables the 'quieter' stakeholders to speak out and encourages the 'noisier' participants to listen. This tool ensures a balanced and comprehensive understanding of stakeholder needs.

The problem census is based on small group dynamics. It uses a non-threatening focussed discussion to list, in order of priority, the real and perceived problems of stakeholders and their proposed solutions. Only the stakeholders can contribute to the process – the role of the water management institution is confined to facilitating and keeping the discussion focused. No problem is rejected, and all solutions are considered. If the process is carried out correctly, the ranking of problems and preferred solutions is made entirely by the stakeholders.

The 9 steps for carrying out the problem census are detailed in the Guidelines. They are

Step 1 – Initiate a meeting with stakeholder leaders to evaluate the extent of interest and capacity.
Step 2 – Collect the base data in a participatory way, and then draw up a menu of activity options that is realistic for the resources of the catchment management institution yet large enough for the stakeholders to have real choices.
Step 3 – Hold the problem census meeting, bringing together all participating stakeholders. Pose one question only as the focus of the meeting. This could be something like *What are the priority water resource management needs in this area?*
Step 4 – Participants record their responses to the single question as individuals.
Step 5 – Participants then form groups of about seven people and discuss their responses in the small group. Each group is asked to try and reach consensus on the problems they collectively consider to be the most important.
Step 6– Each group reports their problem list in order of priority to a plenary session of participants. The facilitator tries to find consensus for the top five problems, which are then recorded as the Stakeholder Framework of Interest.
Step 7 – The water management institution then introduces its own Framework of Interest (the menu of options described in Step 2).

To initiate a meeting first approach the stakeholder leaders



Problem Tree for IWRM activity showing relationships between causes and effects

Step 8 – The facilitator then compares the two frameworks of interest and, with the participants, identifies overlapping interests. If possible, approval of some small practical activities should be announced immediately to demonstrate commitment and goodwill of the catchment management institution.
Step 9 – After agreeing on when to meet to discuss the next steps, the meeting closes.

Problem solving to address overlapping needs

Formal problem solving to address priority needs is best structured as a series of meetings with those participants who will be carrying out implementation. Each meeting focuses on solutions to a particular problem and aims to identify the cause-and-effect relationships. A useful tool for problem solving is The Problem Tree. This is developed as a group activity with stakeholders who can contribute technical and local knowledge.

Before starting work on preparing a problem tree, the practitioner should collect background information, identify the likely implementation participants, and actively involve them. Six steps are used to construct the problem tree itself:

1 Identify and list the nature of the priority need to be addressed
2 Identify cause and effect
3 Check the logic
4 Draft the problem tree diagram
5 Deal with overarching constraints
6 Prepare an Objective Tree

The Logical Framework

Once the problem-solving process has arrived at an agreed IWRM outcome, this information can be organised using a tool called The Logical Framework. The Logical Framework helps participants order information, identify assumptions, and check that inputs will be sufficient to achieve outcomes. It is a useful tool for participants developing an implementation schedule and recording each activity – the inputs required, who will be responsible for what, and how participants and investors will know when an action is successfully completed.

	Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Assumptions
GOAL	The objectives the project or programme sets out to achieve.	Changes that will indicate the goal is achieved.	Statement of how data on the goal is to be collected.	Assumptions for achieving goal targets.
OUTCOMES	The primary reasons for the project or programme.	Conditions that will indicate that outcomes are achieved.	How data outcomes will be collected and measured.	Assumptions for achieving outcomes.
OUTPUTS	The direct measurable results of the project or programme.	Extent and nature of outputs.	How data on outputs will be collected and measured.	Assumptions for achieving outputs.
INPUTS	The resources allocated to the project or programme.	Implementation budgets (by type and quantity).	How implementation target will be monitored.	Assumptions for providing inputs.

Schematic chart for a logical framework

The Strategic Investment Framework

The Strategic Investment Framework is a tool that helps participants develop strategies and actions for each outcome, and organises the components of strategies for easy appraisal and implementation. An example is presented in the guidelines. It is ideally suited to the development and presentation of a Catchment Management Strategy, because it focuses on the outcome – the primary reason for an IWRM programme. Examples of outcomes in IWRM are reduced sedimentation in a river, improved irrigation water use efficiency or increased water allocation to an agricultural cooperative.

The Action Planning Framework

The Action Planning Framework is a tool to help participants develop the implementation activities identified in the Strategic Investment Framework in more detail. It is ideally suited to presentation of water management business plans. In a strategy for soil conservation, for example, some typical activities would be: field days to raise awareness and build capacity, participatory land use and land capability mapping, demonstrations of best management practice for grazing and cropping land uses, construction of soil conservation works around dongas or vulnerable areas, and monitoring soil loss and in-stream sedimentation over time.

Action	Why do it?	Who will do it?	When will it be done?	What resources will be needed?	How will we know it's done?

Schematic format for action planning framework

The action planning framework enables participants to focus on priority actions, negotiate who is going to do what, and decide where the resources will be found. It helps make expectations realistic, because it describes real action on the ground.

Case Study Box: Action planning with stakeholders in the Kat River Valley

3. APPRAISAL TOOLS

The previous chapter described planning tools for use with participants. Once investments have been planned and prepared, they need to be analysed and reviewed. This process is known as Appraisal, which is the step in the investment cycle where things are checked before going ahead with implementation.

Financial and economic analysis

Financial and economic analysis is the appraising of projects or activities to see if they are likely to result, efficiently and effectively, in their intended goals and outcomes. Some of these tools identify benefits and costs of projects, while others put values to the benefits and costs. Unfortunately there is very little existing data available in South Africa to carry out the economic appraisal of catchment investments, although this is being rectified.

Financial Analysis assesses the costs and benefits of a project from the perspective of water users within the catchment area, but does not include benefits or costs to people outside the catchment. Economic Analysis is much broader, and considers all costs and benefits, regardless of who receives them or whether or not the costs and benefits can be exchanged for money. For example the environmental benefits of conserving endangered species would be considered in economic analysis but not in financial analysis.

A number of methods are used in financial and economic analysis:

- Benefit Cost Analysis compares the costs and benefits over time for various project options. The analysis yields important information, such as the net present value of benefits, the benefit-cost ratio, and the internal rate of return.
- Sensitivity Analysis calculates the impact on results when changes are made to key parameters, for example when costs change or when the discount rate changes.
- Optimisation Models show how to maximise a particular function within given constraints. These techniques include linear, non-linear and dynamic programming.
- Regression Analysis shows how one variable in an equation is determined by the relationship between independent variables.
- Simulation Models model processes over space and time, and have the ability to integrate data and relationships.
- Multiple Criteria Analysis allows several objectives and a range of values (not only financial values) to be considered when making decisions about, for example, allocation of resources or appraising an investment proposal.

These techniques can be used in conjunction with one another. The most straightforward and cost-effective combination is to use benefit cost analysis together with sensitivity analysis.

Case study box: Changing water salinity in the low Vaal/Riet irrigation area

Benefit cost analysis

Benefit cost analysis is used to organise and then compare the relative values of a range of possible responses to achieve the desired IWRM outcomes in relation to a particular problem. For example in relation to the problem of sedimentation, desired IWRM outcomes would be improved water quality, soil conservation, improved soil health, community development, and conserved wetlands. There are a number of alternative IWRM investment possibilities – to clear invasive alien vegetation, to revegetate sloped recharge areas, to improve grazing and farming techniques, to reduce the irrigated area, to install standpipes and septic tanks or composting toilets for the community. Using an action framework, participating stakeholders can identify costs and benefits for most of these actions. With the help of an economist, they can use benefit cost analysis to organise and compare the values of these actions.

This section presents two different frameworks for identifying the costs and benefits of a planned IWRM strategy. Costs and benefits can be priced (things that can be traded for money, such as fertiliser or crops) or unpriced (things that cannot be traded for money, such as soil loss or aquatic habitat). The valuation calculations normally require specialist work from an economist, although participants can work in partnership with the economist. Classifying project benefits and costs, both priced and non–priced, helps to organise the project's components into a cost-sharing framework.

Case Study box: Values of goods and services supplied by Crocodile River ecosystems

The economics of natural resources

One difficulty in appraising IWRM investments concerns the changes to natural resources. How do we value the benefits of increased aquatic habitat, or the costs of algae in a river supplying water to a community? Such intangible benefits and costs are traditionally not counted, and this creates distortions in IWRM investment decisions.

This section introduces a number of tools to include such intangible costs and benefits. Concepts of natural resource economics can be applied to catchments – these include public goods, private goods, common pool resources, externalities, and social benefits and costs. Two categories of methods for valuing non-market costs and benefits are

described. Revealed preference methods work out values from observations of people's behaviour. Stated preference techniques involve a sample of people being asked about their preferences for hypothetical outcomes.

Some of the newer economic tools used to estimate values for intangible or 'non-market' costs and benefits are introduced, including replacement cost technique, travel cost technique, hedonic pricing technique, contingent valuation technique, and choice modelling. These tools are complex and normally require support from a resource economist, but a community can often participate meaningfully in generating the information necessary for the valuation.

Rapid Appraisal Techniques

Rapid Appraisal Techniques are biophysical modelling techniques of varying complexity that have been developed to capture the effects of IWRM on soil and water resources. As their name implies, they are faster and less costly than other techniques. They recognise that data for more complex models is often lacking and so key assumptions have very wide ranges of confidence, which means that more expensive and complex models are only as accurate as their least accurate part. Rapid appraisal techniques often are used in IWRM to explain variation in water resource impacts using the smallest possible set of variables, recognising that there are a small number of key drivers of change, and appraisal of them is more cost effective than intensive models.

4 TOOLS FOR IMPLEMENTATION

Once a catchment management programme has reached the implementation stage, a number of economic tools can be used. These tools are often used together with the tools described in the *Participatory Guidelines*.

Cost-sharing tools help participants to negotiate relationships between public (government) and private beneficiaries.

Portfolio Analysis helps participants and catchment agencies to select between investment alternatives when a programme manages several projects.

Environmental Management Systems help participants to standardise best practice resource management and document continuous improvement processes.

Cost-sharing principles

Cost-sharing principles can be used by participants to determine what share of the costs of natural resource management is the government's responsibility and how much is the private sector's responsibility. Three different principles can be used to share costs.

The polluter-pays principle states that anyone whose activities contribute to natural resource degradation should pay for the steps taken to alleviate and manage the problem.

The user-pays principle states that those who benefit from IWRM investments should pay for the IWRM programme. In practice this means that people who live in the upper catchment pay less because they are usually less vulnerable to problems such as flooding, decreasing catchment yield due to aliens, and water pollution or salinisation.

The beneficiaries-compensate principle requires that the beneficiaries of high quality environments compensate land and water managers for the ongoing costs of maintaining the benefits. Benefits in this context could include ecological functions, environmental services, or intangible benefits for current and future generations.

Of the three principles, the beneficiaries-compensate approach is the most popular in cost-sharing agreements between government and the private sector. This is not necessarily because it is the best, but it is often politically difficult for a government to introduce user-pays or polluter-pays systems.

Allocating benefits and costs

Once benefits and costs have been identified and valued, they have to be allocated to public or private stakeholders. All decisions about who bears the costs must be carefully negotiated. As a general rule, government should be responsible for non-market benefits and costs, and for those costs that affect communities or future generations. The guidelines show two different ways of doing this. The first shows short and long-term benefits of on-ground works, allocated between private and public sectors. The second is a summary matrix for allocating benefits and costs. The matrix shows different scales, using spatial presentation, which allows the distribution of project impacts to be assessed across the landscape.

Portfolio analysis

When catchment authorities and their stakeholders have to manage a long-term programme of investments, the tool of Portfolio Analysis allows participants to allocate scarce resources strategically. The portfolio analysis method uses four categories to allocate investment resources, ranked according to the degree of risk of the investment. Use of this tool ensures continuous improvement and a balanced allocation of investment for future needs. It recognises that the outcomes from IWRM investments may become measurable only 10 to 15 years after implementation of on-ground works. Forward planning of this kind is critical to ensure that today's investments benefit future generations.

Environmental Management Systems

This section introduces Environmental Management Systems (EMS). These systems ensure that any activities that have an impact on the environment are managed in an environmentally sound way, within the overall catchment-wide goals. EMS systems may

be developed to aim for outcomes that reflect the overall catchment management goal. EMS can be implemented at farm, village or water user association scale. An EMS can be certified to international standards (ISO 14001).

The five key EMS processes are: policy, planning, implementation, check and monitor, review and evaluate. Each of these processes can be audited by a catchment authority or other third party auditor to certify implementation activities.

Using indicators

Indicators measure changes over time and changes across scale. They show trends in primary data, models or complex statistics. They can be used to tell a story that makes the more detailed data accessible to the wider community.

Indicators should be selected to accommodate scale, which can range from national to provincial to catchment, sub-catchment, village or community, project scale, or household scale. Indicators for South African environmental issues at a national scale are set out in the South African State of Environment Report on water and other resources. Project scale indicators should be developed together with community participants, and should include indicators specific to each catchment and its resource management projects.

Case Study chart: Leading and lagging performance indicators developed with Kat River Valley Project participants

Selection of indicators should take into account certain principles: the indicators should not remain static, they should complement existing systems, they should be linked across scales, they should be selected in partnership with other information providers, and they should be cost-effective, practical, and verifiable. At least some indicators should give early warning of problems.

Measuring intangible change – goal attainment scaling

Goal attainment scaling (GAS) is a participatory tool used to support evaluation of qualitative change. It is easy to use and can be developed quickly to collect data on a range of goals and objectives in a catchment. The GAS approach is ideally suited to participatory evaluation of qualitative investments such as capacity building or the quality of water supplied by catchment authorities. It is a good tool to use both when planning an investment (ante evaluation) and when measuring the performance of an investment (post evaluation). The eight logical steps in developing an effective GAS matrix with participants are described.

REFERENCES AND OTHER RESOURCE MATERIALS

APPENDIX: BLANK CHARTS FOR IWRM USE

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