

TRAINING OF FACILITATION TEAM ON INTEGRATED WATER RESOURCES MANAGEMENT

MODULE 2

Integrated Water Resources Management (IWRM)

APRIL 2011



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WATER RESOURCES MANAGEMENT

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APRIL 2011

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List of Acronyms

BWO:	Basin Water Office
CBOs:	Community Based Organisation
CT:	Core team
EU-ACP:	European Union- African Caribbean & Pacific
GDP:	Gross National Product
GHG:	Green House Gases
GWP:	Global Water Partnership
IPCC:	Intergovernmental Panel on Climate Change
IUCN:	International Union of Conservation of Nature
IWRM:	Integrated Water Resources Management
KCF:	Kikuletwa Catchment Forum
LGRP:	Local Government Reform Programme
MDG:	Millennium Development Goals
MKUKUTA:	Mkakati wa Kukuza Uchumi na Kupunguza Umasikini Tanzania
NAWAPO:	National Water Policy
NGO:	Non Governmental Organisation
NSGRP:	National Strategy for Growth and Reduction of Poverty
NWDS:	National Water Sector Development Strategy
O&OD:	Opportunities and Obstacles to Development
PBWB:	Pangani Basin Water Board
PBWO:	Pangani Basin Water Office
PMU:	Project Management Unit
PPP:	Purchasing Power Parity
PPP:	Purchasing Power Parity
PRA:	Participatory Rural Appraisal
SNV:	The Netherlands Development Organization
TOT:	Training of Trainers
UN:	United Nations
UNDP:	United Nations Development Programme
WMO:	World Meteorological Organisation
WRM:	Water Resources Management
WSS:	Water Supply and Sanitation
WSSCC:	Water Supply and Sanitation Collaborative Council

Introduction

The Pangani Basin Water Board¹ is implementing the Pangani River Basin Management Project, with technical assistance from the International Union of Conservation of Nature (IUCN), the Netherlands Development Organization (SNV) and the local NGO PAMOJA Trust. The project is financially supported by the IUCN Water and Nature Initiative, the Government of Tanzania, the European Commission through grant from the EU-ACP Water Facility and the Global Environment Facility, through UNDP.

The main goal of the Project is to “strengthen Integrated Water Resources Management in the Basin, including mainstreaming climate change to support the equitable provision and wise governance of freshwater resources for current and future generations and to empower Water Users and Managers in Pangani Basin to manage and allocate water resources with consideration for climate change, the environment and other technical information, through consultative processes and the sound framework of integrated water resource management (IWRM)”

The project has the following five Key Result Areas, which contributes to the achievement of the goal:

Result 1: Increased understanding of environmental, economic and social implications of different river flow scenarios under expected climatic conditions and increased capacity to collect and analyze such flow assessment information;

Result 2: Water Users strengthened and empowered to participate in IWRM and Climate Change adaptation processes through dialogue and decentralized water governance;

Result 3: Water Sector’s vulnerability to climate change understood and pilot actions generate lessons in adaptation;

Result 4: Pangani Basin Water Board coordinates other sectors and stakeholders in the development of an IWRM Plan; and

Result 5: Project implementation effectively & efficiently to the satisfaction of all stakeholders.

OBJECTIVE OF TRAINING OF FACILITATION TEAM PROGRAMME

For the forum to be established and community participation to be realized under IWRM; the trainees formed Catchment Facilitation Teams, that were deployed to train or raise communities awareness on different issues in regard to IWRM; entrepreneurs; community participation; gender and other cross cutting issues relating to water resource management, as an initiative to strengthening the capacity of the community to manage the resources at different levels in the catchment once the forums have been established. The TOT equipped the facilitation teams with different facilitation and training skills, methods, tools and approaches in integrated water resources management. As a result, the TOT exercise contributed to empowering the teams with knowledge and skills, which will be transferred to the water users for proper planning and sustainable management of the water resources at their local scale.

TRAINING OF TRAINERS MODULES

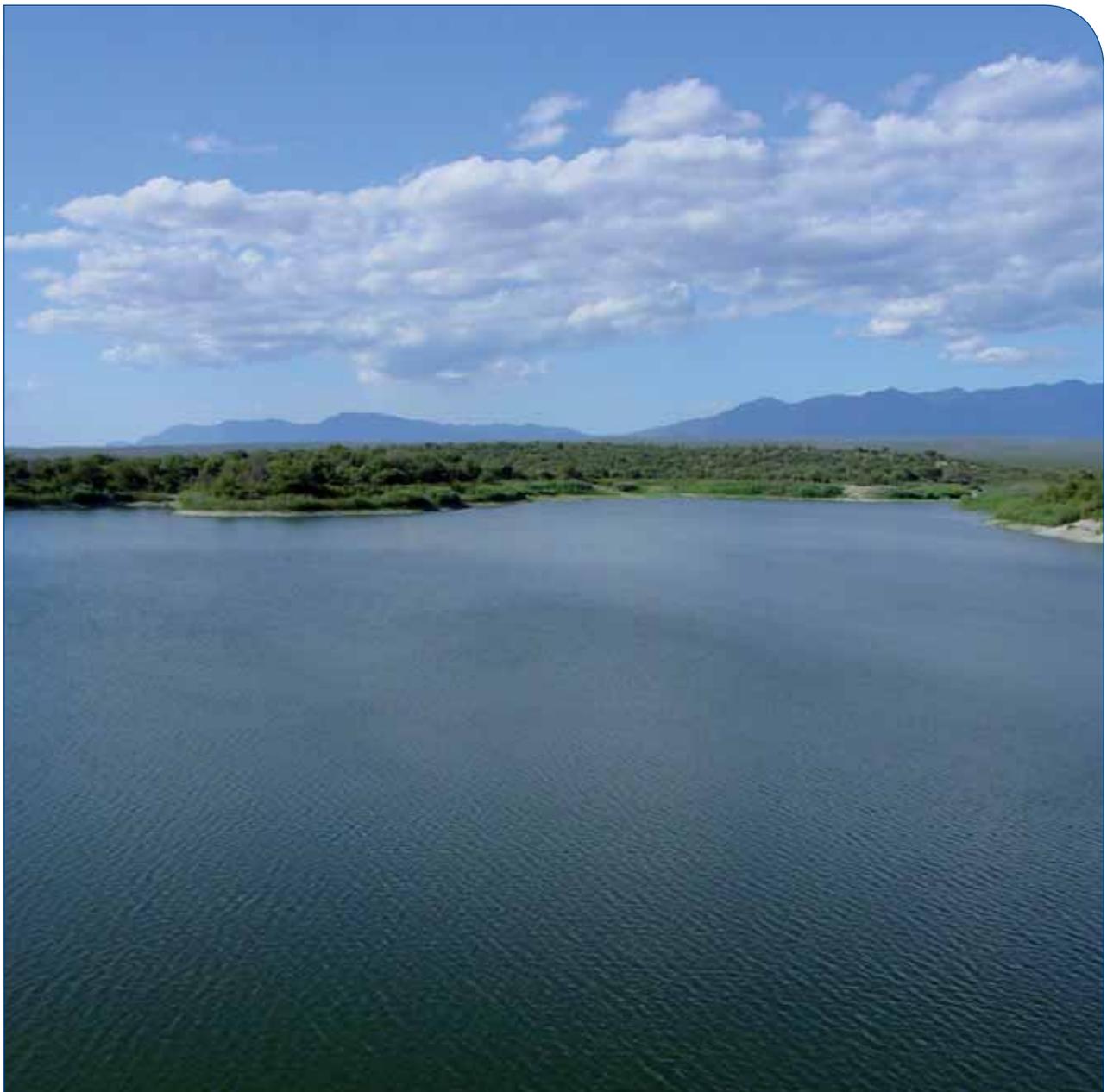
One of the pre-requisites in the process of putting in place the Kikuletwa Catchment Forum is development of training materials to be used for Training of Trainers (TOT) programme covering topics in Integrated Water Resources Management (IWRM), entrepreneurs; community participation; gender and other cross cutting issues relating to WRM, climate change and adaptation strategies and the contribution of water resources in poverty reduction. Towards that end, the three experts contracted to undertake this

¹ Previously called the Pangani Basin Water Office

assignment assembled in Moshi for a five day workshop to develop modules for the proposed training on:
Module 1- Participatory Planning, stakeholder Participation & Gender Mainstreaming (Annexure III)
Module 2- Integrated Water Resources Management (Annexure IV)
Module 3- Entrepreneurship and Finance Management (Annexure V)

This publication contains Module 2 (Annexure IV) titled:
Integrated Water Resources Management
The other modules are available as separate publications

The workshop report from the ToTs is available at the end of this publication in Appendix 2 as a reference.





Training of Trainers (ToT) Programme on Integrated Water Resources Management for Kikuletwa Catchment

TOPIC 1: Water Resources Management And Development

(i) General Objective

To equip participants with knowledge and skills required to improve efficiency and effectiveness in the application of integrated water resources management (IWRM) approach for sustainable management and development of water resources.

(ii) Specific Objectives

At the end of this lesson facilitators will be able to:

- demonstrate understanding of the importance of water resources,
- Understand and explain key issues in water management.
- demonstrate understanding and describe challenges facing water resources and how to such challenges at global, national, basin, catchment and community levels.

(iii) Training contents

- Water as a Resource.
- The Hydrological Cycle and Relationships Between Hydrological Cycle, River Basin, Water Demands and Investment.
- Water Resources Information Systems.
- Other key issues in Water Management globally and locally.
- Challenges facing water resources globally and locally.

(iv) Methodology

- Short lectures
- Brainstorming
- Study tour in the Basin and outside the Basin
- Role Plays
- Q&A session
- Discussion Groups
- Group work

(v) Evaluation

- Ability to answer questions
- Fieldwork reports
- Group reports and in plenary presentations.

1.0 Introduction

We are so much used to **water** we normally take it for granted. Let us dwell a little bit to look into a few facts about what water actually is. Pure water is a colourless chemical compound consisting of an element called oxygen and another called hydrogen. In nature water is never found in its pure state. Normally it is found with dissolved substances derived from the natural environment or from waste products of man's activities.

Water not only serves as a vital substance for human existence but also plays an important role in advancing civilization. Owing to the rapid growth in world economy and civilization, the need for the development of water resources has become more urgent than ever before (Chow 1964). This has continued to be true until the times we are living in now.

1.1 Water as a Resource

Many people have different understanding of the term 'water resources'. The views range from everything found in water to issues regarding the dependability of water on man's actions in terms of livelihoods and other economic gains. **Water resources** are sources of water that are useful or potentially useful to humans. This definition is tied to the usefulness of water to mankind. Fresh water is found in many forms mainly as; surface water (springs, rivers, lakes, artificial reservoirs, wetland), groundwater, desalinated water (from seas and oceans), rainfall and frozen water (in icebergs).

Water uses include; domestic water supply, irrigated agriculture, industrial, hydropower generation, mining, recreational, aquaculture or fishing, environmental and navigation. All these may be found in the Kikuletwa catchment. As you might gather all these require fresh water, which is a renewable resource.

2.0 The hydrological (Water) cycle and the relationships between Hydrological cycle, River Basin, Water demands and investment

2.1 The Hydrological Cycle

Figure 1 describes diagrammatically the concept of what is called a hydrologic cycle (simply a conceptual water budget in nature). Rain and snowfall (sometimes referred to as precipitation) bring to earth freshwater which is harvested for numerous activities. This water runs on the ground, flows in the rivers and lakes and oceans, infiltrates the soil, and then evaporates to create clouds which condense to form rain and snowfall again. These processes are interlinked in a complex, continuously evolving global

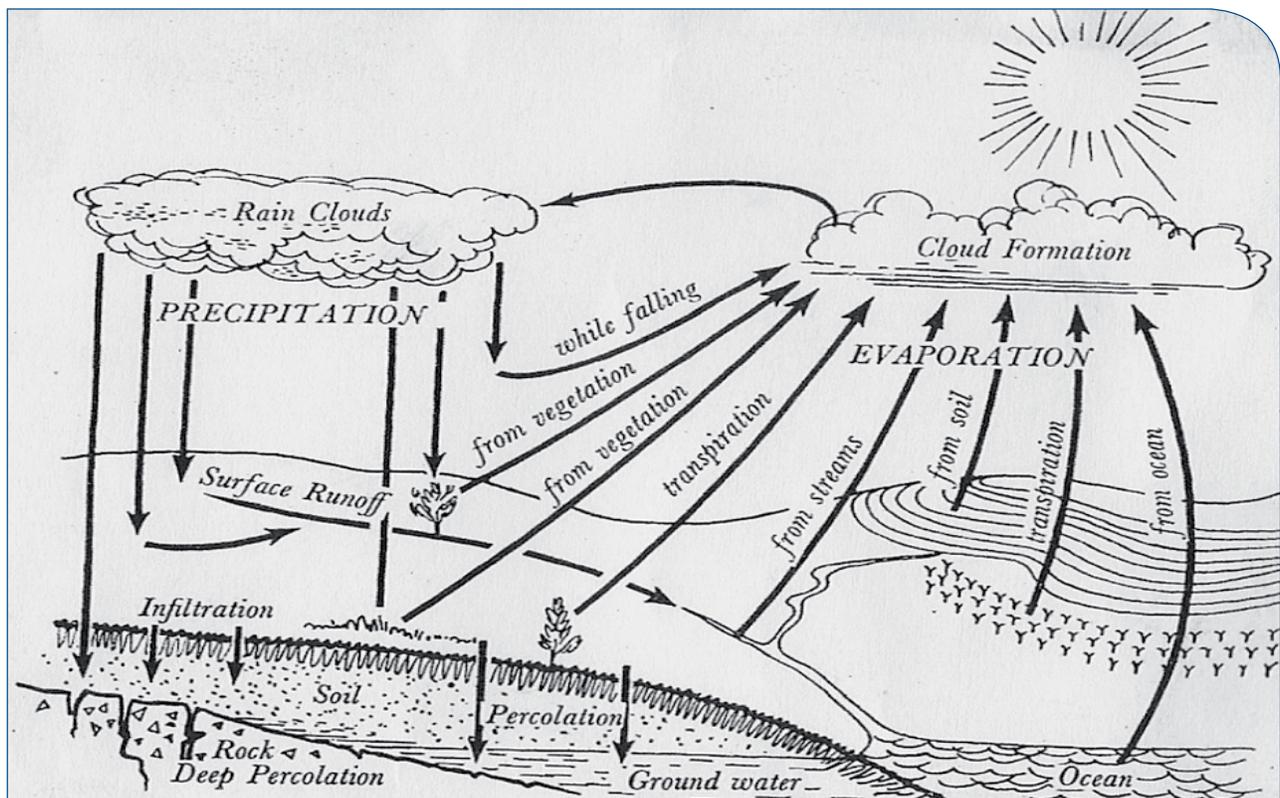


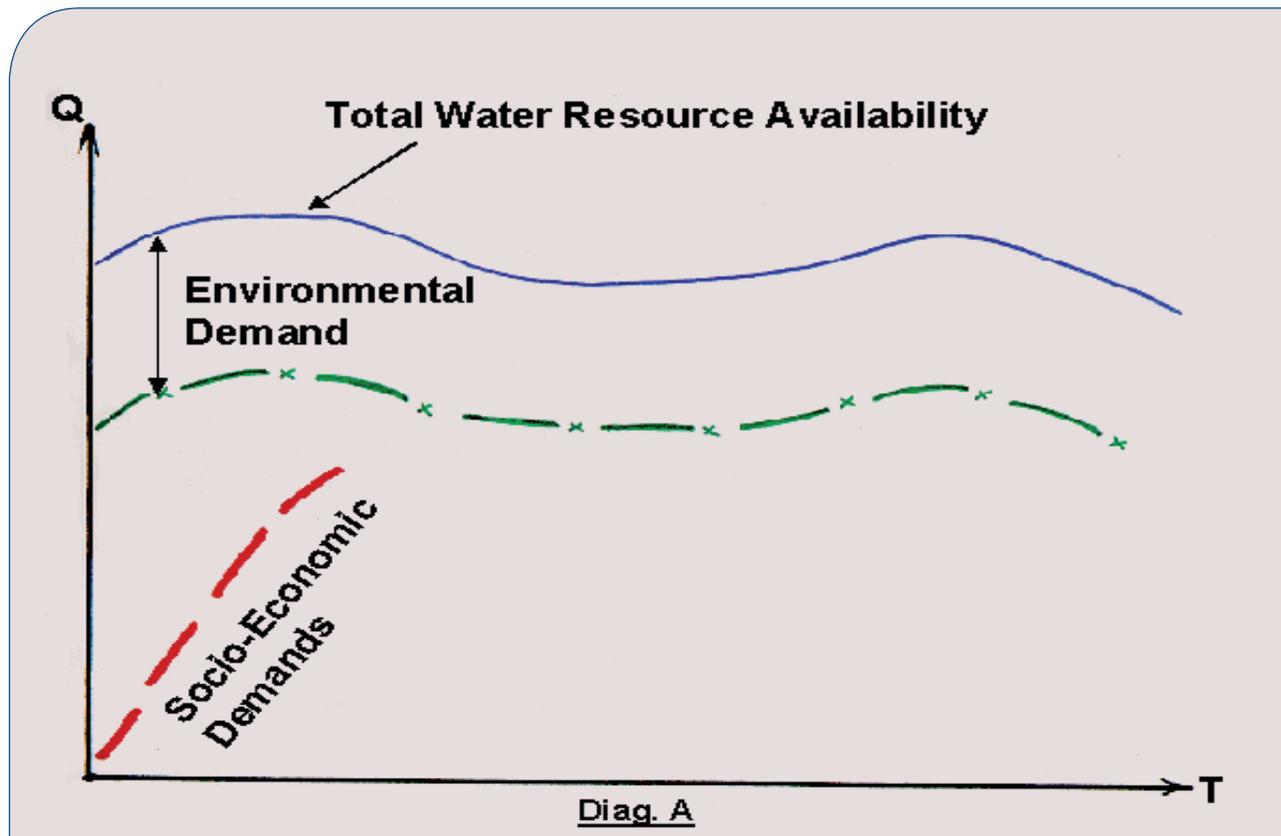
Figure 1: The hydrologic cycle - a descriptive representation. (Ackermann, Colman and Ogrosky [5].)

system called the hydrological cycle. All socio-economic and environmental activities on this planet are entirely dependent on this system, which distributes freshwater independent of human will. The system sustains life but also imposes the threats of drought and flood. It is humankind's indispensable "partner-for-life", in a partnership in which humankind is not dominant. Human activities such as industry, agriculture, irrigation, rural and urban settlements are therefore naturally dependent sub-systems. These sub-systems have a heavy impact on the system, often with negative consequences on, the quantity and quality of available water, climate change, environment and biodiversity (The World Bank Group).

3.0 Relationships between Water Resources, Ecosystem, and Socio-economic Activities Investment

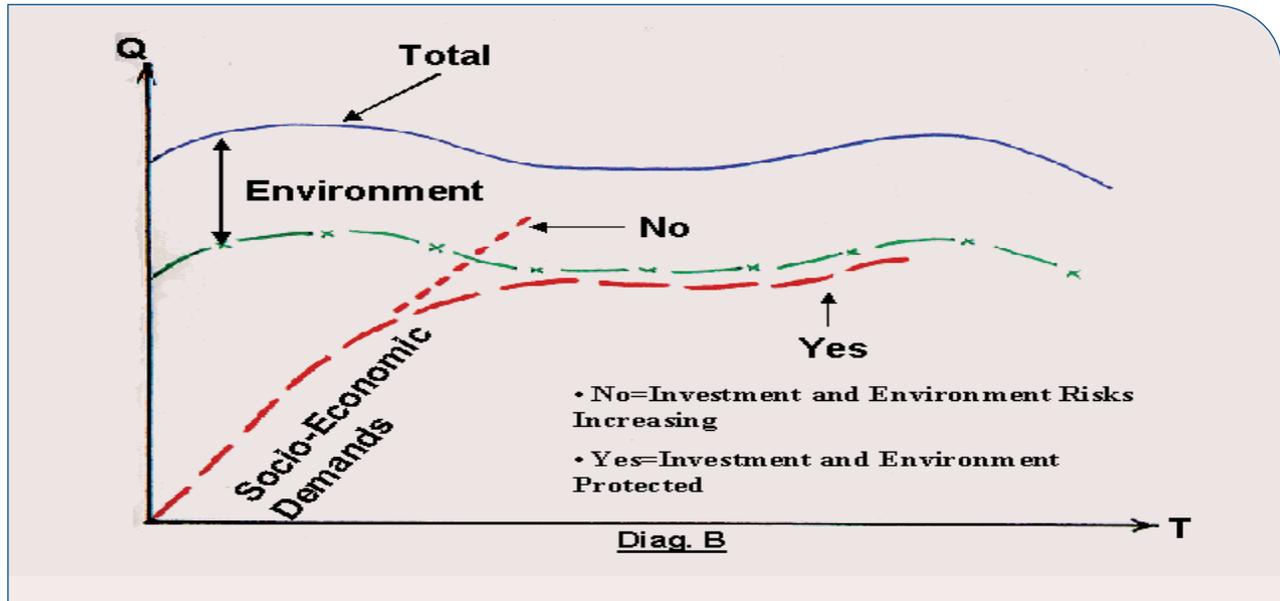
The relationships between water resources, the ecosystem, and socio-economic activities can be demonstrated by using the diagrams A, B, C, and D below. They represent surface water flow in a river basin in terms of Quantity against Time. Groundwater can be treated in the same manner. In each of these four diagrams the upper curve shows the *Total Water Resource Availability* which is available for socio-economic sectors and the environment. Another way of looking at this curve is to consider it the boundary of a hydrological (water) system within which we live.

Diagram A shows total water resource availability for a typical river basin. The environmental demand curve is shown following the upper total water resource curve. The amount of water below the environmental curve is the quantity which is available for the development of all socio-economic activities. In this case the socio-economic demand curve is shown climbing up towards the environmental demand curve which indicates a river basin which still has potential for further development and investment. In such a situation one might not be concerned much with water allocation issues since there is plenty of water available for social economic activities and the environmental needs are well provided for and protected.



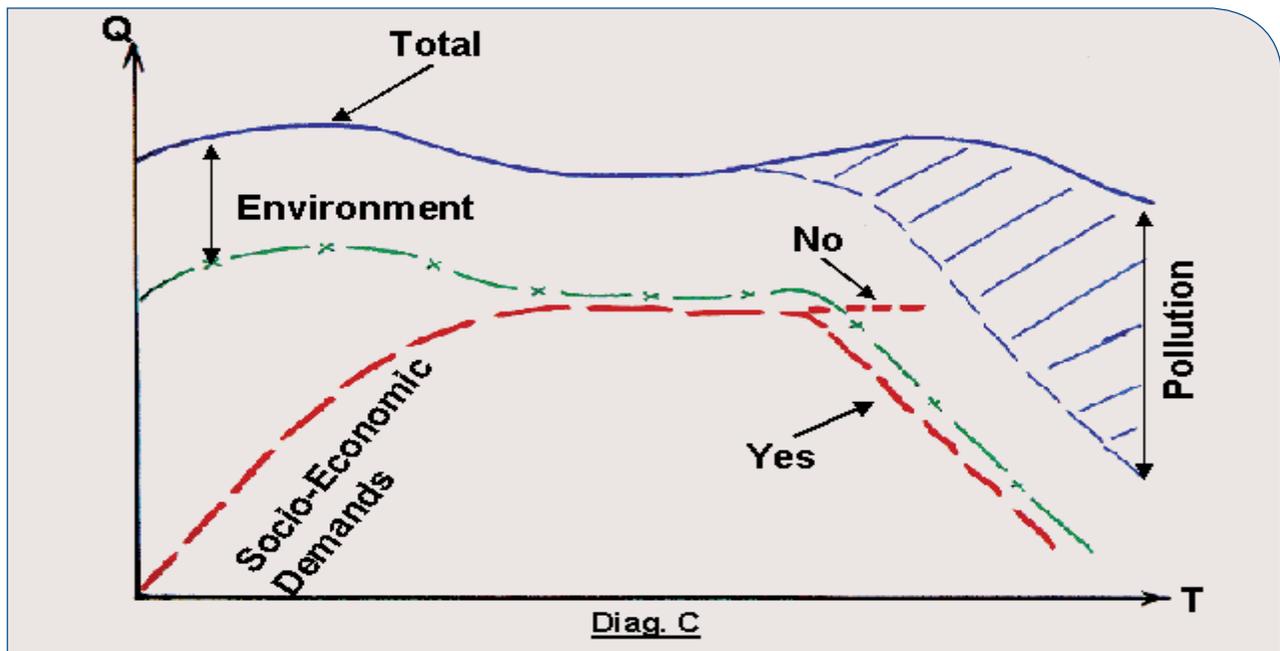
A River Basin with no Allocation Constraints

In Diagram B we see a river basin which has developed all available water resources for satisfying socio-economic demand. In this case water managers have to be very careful when dealing with water allocation issues. Water allocation now becomes the number one economic issue for sustainability. When a river basin is developed to its maximum, we are faced with **two** main cases in which monitoring for water allocation decision making becomes vital for the survival of the economy.



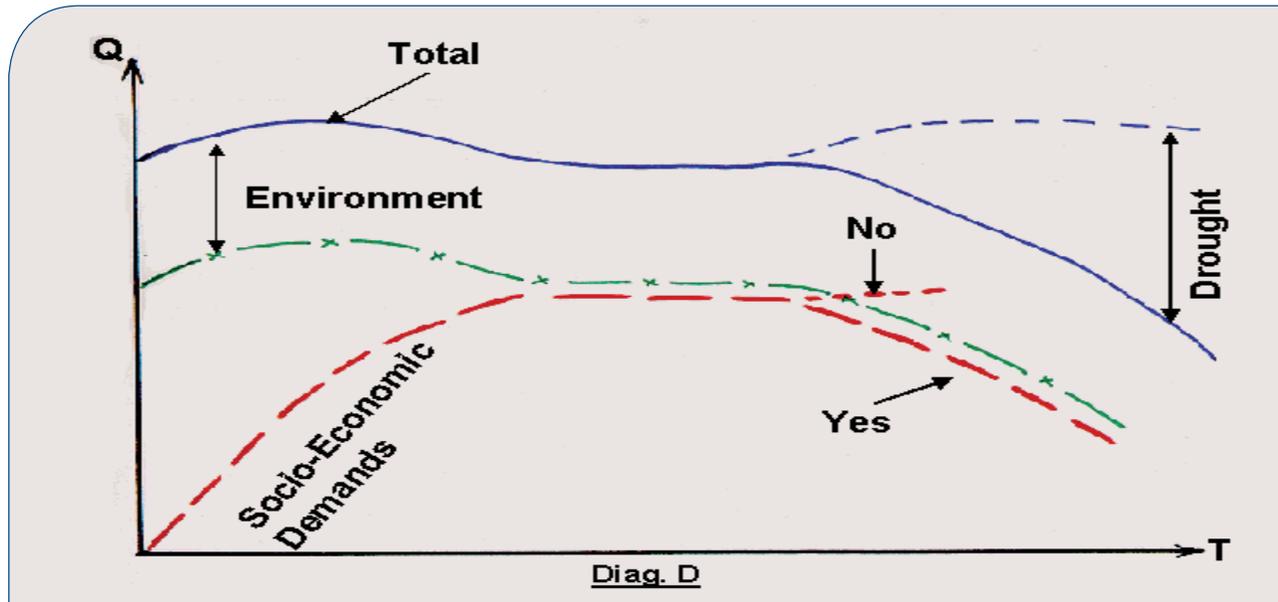
A River Basin with All its Water Resources Developed

The first is **pollution**, which makes water unusable for any purpose and its treatment may be very expensive. This is illustrated by Diagram C which shows the effect of pollution on the socio-economic demand curve. Here we see that this curve is actually descending. This is due to the fact that sufficient water must be left in the river to dilute the pollution in an attempt to minimize the damage to the environment and the aquatic life and to prevent overloading of the water treatment plants.



Effect of Pollution on WRM in a River Basin

The second case is **drought**. The effect of drought is illustrated by Diagram D. Here again the first priority is to protect the environment and the natural resources so as not to worsen the desertification effect due to the lack of water. In such a case we may be required to have in place a monitoring system which is capable of forecasting, or predicting occurrences of droughts as a tool for decision making.



Effect of Drought on WRM in a River Basin

4.0 Water Resources Information Systems

Information systems are important for planning and decision making in water resources management and development aspects. Management of water is a very complex operation requiring new approaches to information exchange between sectors for risk analysis. The objective of this information exchange would be to ensure that all socio-economic activities within a river basin can maximize their capacity to produce wealth without detriment to the environment and without reducing their capacity to attract investment and service debt. Information systems deal on the manner in which data is collected and the way it is managed. The technical implementation of information infrastructure consists simply of creating networks of automatic data collection and transmission systems throughout river basins, linking decision makers, water users groups and stakeholders to each other and the socio-economic and environment activities. The systems normally involve hydrological data. An example of such systems is the World Bank/World Meteorological Organization (WMO) partnership for setting up the World Hydrological Cycle Observing System (WHYCOS).

Decision aiding systems which employ river basin models and digital mapping for the visual simulation of development scenarios for policy makers will be indispensable tools for “bridging the communication gap” between sectors and their stakeholders. In Tanzania we have some of such aids, like the Lake Victoria Decision Aid and the Ruaha Basin Decision Aid.

5.0 Other key issues in Water Management globally and locally

The Global Water Partnership informs us that in the world today it is estimated that: 97.5% of water on the Earth is salt water, leaving only 2.5% as fresh water of which over two thirds is frozen in glaciers and polar ice caps. The remaining unfrozen freshwater is mainly found as groundwater, only a small fraction present above ground or in the air yet the world’s supply of clean, fresh water is steadily decreasing. Water demand already exceeds supply in many parts of the world, and as world population continues to rise at an unprecedented rate, many more areas are expected to experience this imbalance in the near future.

According to GWP, today more than 2 billion people are affected by water shortages in over 40 countries. 263 river basins are shared by two or more nations; 2 million tonnes per day of human waste are deposited in water courses. It is further estimated that half the population of the developing world are exposed to polluted sources of water that increase disease incidence. 90% of natural disasters in the 1990s were water related. The increase in numbers of people from 6 billion to 9 billion will be the main driver of water resources management for the next 50 years.

During the latter half of this century, the pressure on natural water resources in many regions of the world has been increasing dramatically. Currently humans are extracting about half the 12,500 cubic kilometres of water that are readily available. Demand is now growing at twice the rate of population increase and accelerating. This can be attributed to the rapid growth in urban sprawl, the increased pace of industrialization, agriculture and irrigation development and pollution. It is adverted that in 1995 water availability was estimated to be 7,500 cubic meters per person per year, compared to 12,900 cubic meters in 1970.

The National Water Sector Development Strategy states that *'Despite it's seemingly abundance, Tanzania's water resource is a finite resource, which is under pressure and growing scarce as a result of increasing multi-sectoral demands of the rapidly growing populations. Tanzania is endowed with abundant water resources, which are unevenly distributed in time and space, quantity and quality. It has experienced frequent and intense water shortages and water use conflicts, at the same time, it is riparian to all 3 of the largest freshwater lakes in Africa covering an area of 60,000 km² (Lakes Victoria, Tanganyika and Nyasa), and on average, has abundant water resources (2700 m³/capita/yr) in 2001, which will reduce to about 1,500m³ by year 2025 (due to population increase. The demand of water for all uses far exceeds supply'*.

Severe and widespread water shortages exist in many areas both because of climate variability and inadequate management of water resources. Water shortages are growing across many regions in the five basins—Rufiji, Pangani, Ruvu/Wami, Internal Drainage and Lake Victoria—which together cover about 61 percent of the country.

Water is central to the country's economy in which Urban supply coverage is 78 % (7.3 million) & Rural water supply 50 % (for 25.7 million), agriculture contributes 57 % & livestock 18 % of GDP, both are vulnerable to drought, 14 % of irrigation potential uses 97 % of all the water use in the country, Industry

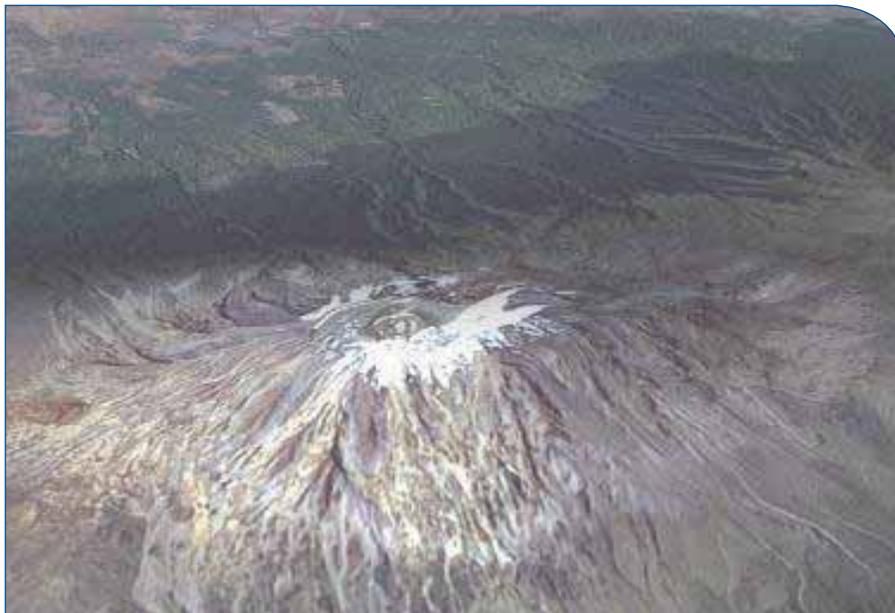


Figure 2: Effects on the Kilimanjaro Ice Cap

& mining contribute 17 % of GDP, Hydropower (mostly in Pangani & Rufiji) provides 70 % of electricity, mostly to urban areas, 85 % of fisheries (298,000 tons/yr) come from inland lakes & reservoirs and wildlife & tourism account for 2 % of GDP.

In Pangani Basin already inadequate supplies threaten the basin's natural resources, livelihoods, agricultural and hydroelectric productivity. Pangani River flows have already been reduced to the point that seawater **intrudes about 20 km upstream** from the estuary, many **conflicts are emerging among water user groups**

– **between upstream and downstream water users, between farmers and pastoralists, between small-scale and large scale water users, between farmers and municipalities** (the conflicts are expected to worsen as climate change and uncoordinated abstractions jeopardize water supplies) and Mount Kilimanjaro a World Heritage Site and its famous glacial ice cap has become a symbol for climate change since it is estimated that about 55% surface area of its glacial ice cap has been lost in the past four decades and expected to disappear completely by 2025.

The water resources available within the Pangani Basin were estimated to be about 1,108m³/person by year 2005. The Kikuletwa catchment is part of the upper zone of Pangani basin which represents the portion upstream of Nyumba ya Mungu Dam. Water resources in the upper zone were estimated to be about 2,063 km³/year and the available water was 934 m³/person /year. Water abstraction in the upper zone was estimated to be about 1,634 km³/year which amounted to 79% of the renewable water resources in this zone. Water resources availability in the catchment is largely related to rainfall. Within the catchment, geographical distribution of annual rainfall is significantly uneven. The highest rainfall (1000mm/year - 2000mm/year) appears in the high lands, Southern mountain slopes of Kilimanjaro and Meru. In the lowlands, annual rainfall is commonly between 300mm/year to 600mm/year. The rainy season is usually subdivided into two seasons; short rains lasting from October to December and long rains which span between mid-March through mid-May or early June as large variations are sometimes experienced thus causing rainfall unreliability (Owino 2007).

More than 90% of the water consumption depends on surface water, out of which about 90% is used for irrigation. A major portion of water consumption is through traditional irrigation furrows. There is intensive groundwater use in the catchment. Boreholes are normally sunk 100-200m deep. Water Pollution is also a challenge in some parts of the Kikuletwa catchment and the Pangani Basin.

6.0 Challenges facing Water Resources Management Globally and Locally

Water experts have predicted that by the year 2025 water demand will be determined by four major driving forces; **population, technology, trade** and the **environment**. The increasing global population is expected to drive the need for technologies for improving water-use efficiency. This will necessary as water becomes a limiting factor in the process of increasing food production and industrialisation and for maintaining the environment. This leads to expect that such technology might enable some countries to use scarce resources to produce high-value products which can be traded for food grown by more water endowed countries, thereby enabling them to move away from the policy of food self-sufficiency to one of food security. In order to reduce agricultural and industrial pollution, it will necessitate developing waste water treatment technologies which play a major role in shaping the future supply of freshwater.

In Tanzania like anywhere in the globe we are faced with challenges such as climate change and variability (occurrences of floods, & droughts, high temperatures, etc.), low water levels in reservoirs resulting into power load shedding, lost industrial & commercial production, high population growth, increasing demands of water, low water supply coverage & poor water utility management, unsustainable water supply schemes, low irrigation efficiencies, water allocation problems, uncoordinated socio-economic developments, water pollution, catchment degradation, water weed infestation (in lakes and dams), environmental flow issues and numerous international waters to share.

6.1 Water resources management and development problems in the Pangani basin

Pangani basin has similar water related problems (Owino 2007);

- It is a water stressed-basin having less than 1,200 cubic meters of water per person per year
- There is poor land-use practices such as intense deforestations of catchment areas (Mts Meru, Kilimanjaro, Usambara and Pare), farming along river-banks, in stream-valley bottoms and spring sources, and livestock numbers have increased considerably especially in the lowland areas of the basin

- There is increased siltation due to poor land use practices which led to flooding, poor water quality and clogging up of hydro-power generating dams,
- Most small scale farmers use the traditional furrow system of irrigation which is very inefficient and loses estimated to be over 85% of water starting from the point of abstraction to the point of use. Repetitive irrigation increases the likelihood of soil salinity.
- Inadequate water quantity monitoring system to ascertain how much water is available in the basin to provide a basis for water rights allocation including taking into account the amount of water required to maintain the basin's environmental system. Water quality monitoring system is also inadequate in the basin.
- Unauthorised abstractions are not well known. Sometimes even with water uses with water rights, the day to day amount of water in abstracted are not exactly known or regularly monitored. This is because of the reason(s) given in number (v) above.

7.0 Conclusions

Water resources management is everywhere is faced with numerous crises and challenges. There is a water stress, and the stress is due to population growth, increased affluence also poverty, expansion of business activity, rapid urbanization, climate change and variability, depletion of aquifers, pollution and water protection, water use conflicts and economic drivers. Fresh water is finite and is becoming more vulnerable. The global community is critically developing strategies to sustainably manage and develop water resources. Proper water governance is critical to addressing water resources issues both locally and globally.



TOPIC 2: Water Governance

(i) General Objective

To equip participants with knowledge on water governance issues, characteristics, tendencies, challenges and practices.

(ii) Specific Objectives

At the end of this module facilitators will be able to:

- explain the concept of Governance
- describe some water governance crises
- identify and describe current governance instruments (policies, strategies, laws and institutional framework) on water resources management and development;
- appreciate the need for reforms to the way water is being managed.

(iii) Training Contents

- Principles of Governance
- Water Governance Crises.
- Legal and Institutional frameworks in Tanzania for WRM.

(iv) Teaching methodology

- Short lectures
- Study tour in the catchment/basin
- Role Plays
- Q&A sessions
- Discussion Groups
- Group work

(v) Evaluation

- Ability to answer questions
- Field work reports
- Group reports and in plenary presentations

1.0 Introduction

The 2nd World Water Forum in 2000 in The Hague recognised that: the water crisis is essentially a governance crisis and that effective water governance is required to ensure efficient and effective water resources management. Some definitions of governance are provided below:

- (i) Governance, as defined by the World Bank in its 1992 report, is the manner in which power is exercised in the management of a country's economic and social resources for development; -the capacity of governments to design, formulate, and implement policies and discharge functions. Such areas as public sector management, accountability, legal framework for development, and transparency and information are considered.
This considers the process by which governments are selected, monitored and replaced; the capacity of the government to effectively formulate and implement sound policies and the respect of citizens and the state of the institutions that govern economic and social interactions among them.
- (ii) An alternate definition sees governance as the use of institutions, structures of authority and even collaboration to allocate resources and coordinate or control activity in society or the economy.

Therefore good governance is characterized by predictable, open, and enlightened policy making (that is, transparent processes); a bureaucracy imbued with a professional ethos; an executive arm of government accountable for its actions; and a strong civil society participating in public affairs; and all behaving under the rule of law.⁴ Good water governance is driven by political decision processes, economic and social environment, and administrative mechanisms that facilitate water security objectives.

1.1 What is water governance?

Water governance is the set of systems that controls decision making with regard to water management and water service delivery. Simply put, water governance is about who gets what water, when and how. Systems of water governance usually reflect political and cultural realities at national, basin (intermediate) and catchment/subcatchment and Water User Association levels.

Governance of water resources and water service delivery functions more effectively within a system which enables broad participation by civil society including community based organisations (CBOs), NGOs, private enterprises and the media network to support and influence government including local government. This means forums where stakeholders discuss and make decisions need to be strengthened or established at different levels and steps taken to ensure stakeholder platforms play a prominent and active role in systems of water governance.

1.2 Why water governance matters

As competition for water intensifies, it becomes more and more difficult to find simple technical solutions to water related problems. Increasingly, solutions involve trade-offs between costs for different groups which require management of demand and enforcement of regulations.

2.0 Principles for Effective Water Governance

2.1 Attributes of water Governance

Although there is no single model for effective water governance the following are the principle attributes for effective water governance:

- (i) *Open and transparent:* Institutions should work in an open and transparent manner. Information should flow freely between stakeholders while decisions and decision making processes should be transparent and subject to public scrutiny.
- (ii) *Inclusive and Communicative:* Improved participation, depending on all levels of government, is likely to create more confidence in the end result and in the institutions that deliver policies. Decision making should take place within an integrated water resources management framework.
- (iii) *Policies must be Coherent and integrative:* Participatory processes are key. All citizens, men and women, poor and well off, should have a voice in management processes, either directly or through organisations representing their interests. None should be left unconsidered.
- (iv) *Equitable and Ethical:* All men and women should have opportunities to improve or maintain their well-being. Water management should be aligned with poverty reduction strategies. Equity between and among the various interest groups, stakeholders, and consumer-voters needs to be carefully monitored throughout the process of policy development and implementation.

In terms of performance and operation, good governance requires that the processes and operations are:

- (i) **Accountable:** Roles in the legislative and executive processes need to be clear. Each institution must explain and take responsibility for what it does.
- (ii) **Efficient:** Providing economic efficiency, and also concepts of political, social and environmental efficiency.
- (iii) **Responsive and sustainable:** Policies must deliver what is needed on the basis of demand, clear objectives and evaluation of future impact and, where available, of past experience.

3.0 Water governance crises

Sectoral approaches to water resources management have dominated in the past and are still prevailing. This leads to fragmented and uncoordinated development and management of the resource. Moreover, water management is usually in the hands of top-down institutions, the legitimacy and effectiveness of which have increasingly been questioned. Thus, weak governance aggravates increased competition for the finite resource.

Many of the underlying causes can be traced to three types of governance failure, which are inherent in most countries:

- *Market failure* (e.g. incomplete/non-existent property rights, uncorrected environmental and social externalities, incomplete information, information asymmetries, monopoly).
- *Institutional system failure* (e.g. lack of worker commitment, no public respect/compliance culture, incomplete regulatory systems, failure to regulate monopolies, no legitimacy for regulators or service providers).
- *Government failure* (e.g. water agencies acting to further internal, not public interests, capture vested interests, capacity constraints, bureaucracy, lack of accountability).

The next section looks at water governance issues in terms of current legal and institutional frameworks in Tanzania

4.0 Legal and Institutional frameworks for WRM in Tanzania

4.1 Water Policy

The current policy framework for the water sector in Tanzania is set out in the National Water Policy (NAWAPO, 2002). It is oriented towards reaching the Millennium Development Goals (MDGs) for water and sanitation in Tanzania and incorporates the overall development goals set out by the Vision 2025 and the National Strategy for Growth and Reduction of Poverty (NSGRP - MKUKUTA) which aims to eradicate abject poverty and attain a high quality of life for all Tanzanians by 2025.

To implement NAWAPO, a National Water Sector Development Strategy (NWSDS 2008), with a time horizon of up to 2015 has been endorsed. The overall objective of NWSDS is to contribute to poverty reduction through improvements in the governance of water resources management and the sustainable delivery of water supply and sanitation services. The National Water Policy, together with the National Water Sector Development Strategy provides solid foundation for the development and implementation of Water Resources Management as well as Water Supply and Sanitation (WSS) service delivery.

The main objectives of the National Water Policy, 2002, are to:

- (i) address cross-sectoral interests in water, watershed management and participatory integrated approaches in water resources planning, development and management;
- (ii) lay a foundation for sustainable development and management of water resources in the changing roles of the Government from service provider to that of co-ordination, policy and guidelines formulation, and regulation;
- (iii) ensure full cost recovery in urban areas with considerations for provision of water supply services to vulnerable groups through various instruments including lifeline tariffs; and ensure full participation of beneficiaries in planning, construction, operation, maintenance, and management of community based domestic water supply schemes in rural areas.

As far as water resources management is concerned the **NAWAPO (2002)** emphasises the following:

(i) *Comprehensiveness*: A holistic basin approach for integrating multi-sector and multi-objective planning and management that minimizes the effects of externalities, and ensures sustainability and protection of the resource,

(ii) Subsidiarity: decentralizing decision making and devolving to the lowest practicable level, with stakeholders participating in the planning, design, implementation of the management actions and decision making, and

(iii) Economic: decision making in the public sector, private sector and in civil society on the use of water should reflect the scarcity, value of water, water pricing, cost sharing, and other incentives for promoting the rational use of water.

There are other sector policies that relate to water resources management, water supply and sanitation services including the following:

- The National Health Policy
- National Environmental Management Policy
- Local Government Reform Programme (LGRP)
- The National Agricultural and Food Security Policy
- The National Forestry Policy
- The National Lands Policy

The specific objectives and other important provisions of NAWAPO for water resources management will be looked into when discussing the subject of implementing IWRM.

4.2 Legislative framework

Water Resources Management in Tanzania is governed by the Water Utilization (Control and Regulation) Act No. 42 of 1974, together with its amendments (Acts No. 10 of 1981, No 17 of 1989 and No. 8 of 1997). Currently a consolidated version CAP. 331 is in use. A new legislation (Water Resources Management Act) whose bill was passed by , Parliament in April 2009.

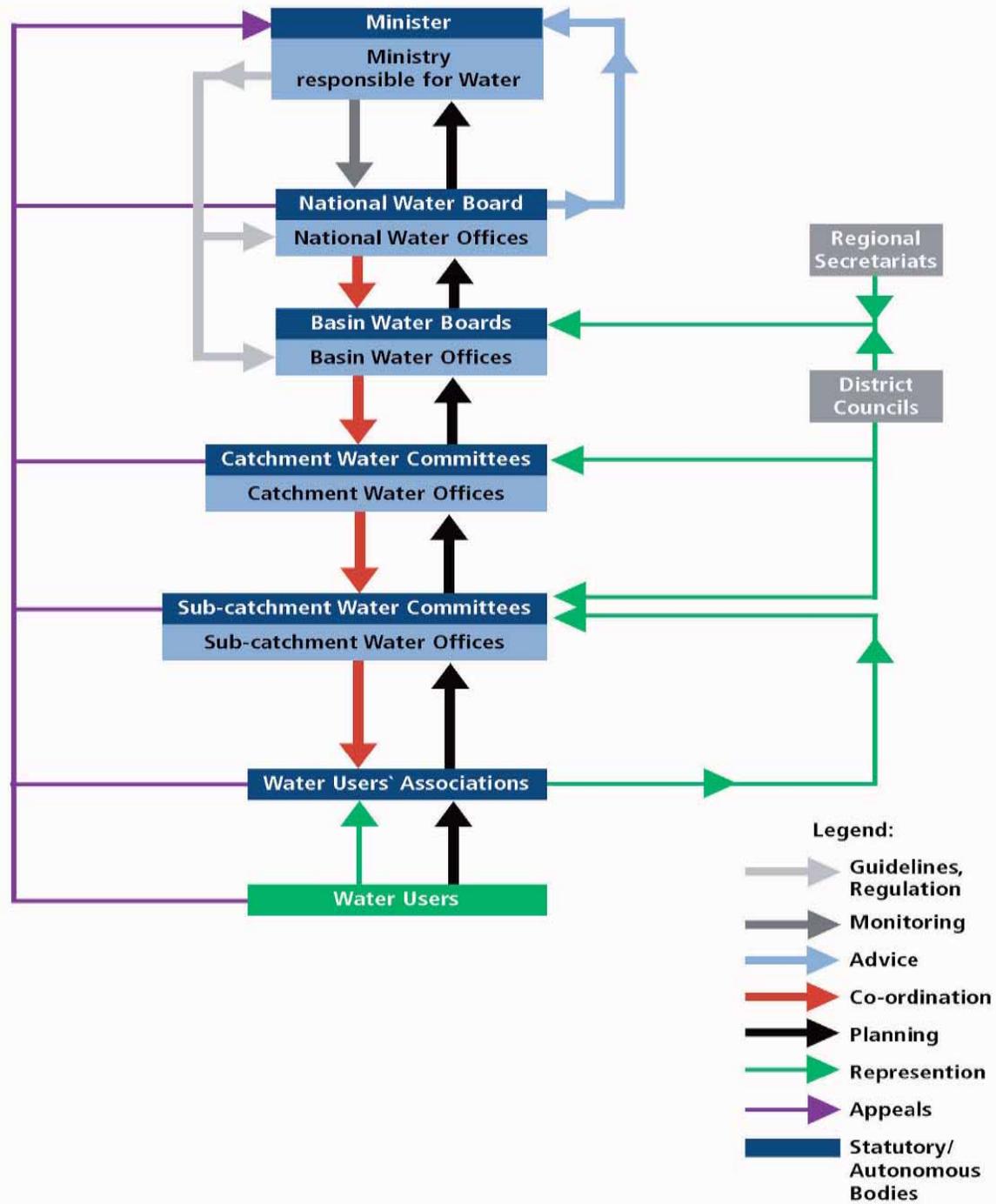
Nine basins have been formed namely; Pangani River Basin (1991), Rufiji River Basin (1993), Lake Victoria Basin (2000), Wami-Ruvu Basin (2001), Lake Nyasa Basin (2001), Lake Rukwa Basin (2001), Internal Drainage Basin to Lake Eyasi, Manyara and Bubu depression (2004), Lake Tanganyika Basin (2004), Ruvuma and Southern Coast Basin (2004). Act No. 42 of 1974 declares that all water in the country is vested to the Government of the United Republic of Tanzania,

There are other sectoral laws which are related to WRM. The main ones include (a) Water Works Ordinance Cap. 272 as amended by Act No. 8 of 1997. (b) The National Urban Water Supply Act, No 7 of 1981 established the National Urban Water Authority (c) The Public Health (Sewerage and Drainage) Ordinance, 1955 (d) the Energy and Water Utilities Regulatory Act, 2001, to regulate *inter alia* the provision of water services. In the water sector, the Energy and Water regulatory Authority (EWURA) is responsible for issuing licenses to Water Supply and Sewerage Authorities , (e) National Environmental Management Act 2004 (f) National Forestry Act 202 (g) The Land Act (1999) and The Village Land Act (1999) guides issues of land ownership and transfer (h)The Town and Country Planning Ordinance Cap 378 of 1956 (as amended in 1961), (i) The Land Use Planning Commission (1982) and local Government Authorities (1982), (j) Wildlife Act (1974) (k)Fisheries Act (2003). Notice that there is weak coordination between the sectors on the implementation of these laws.

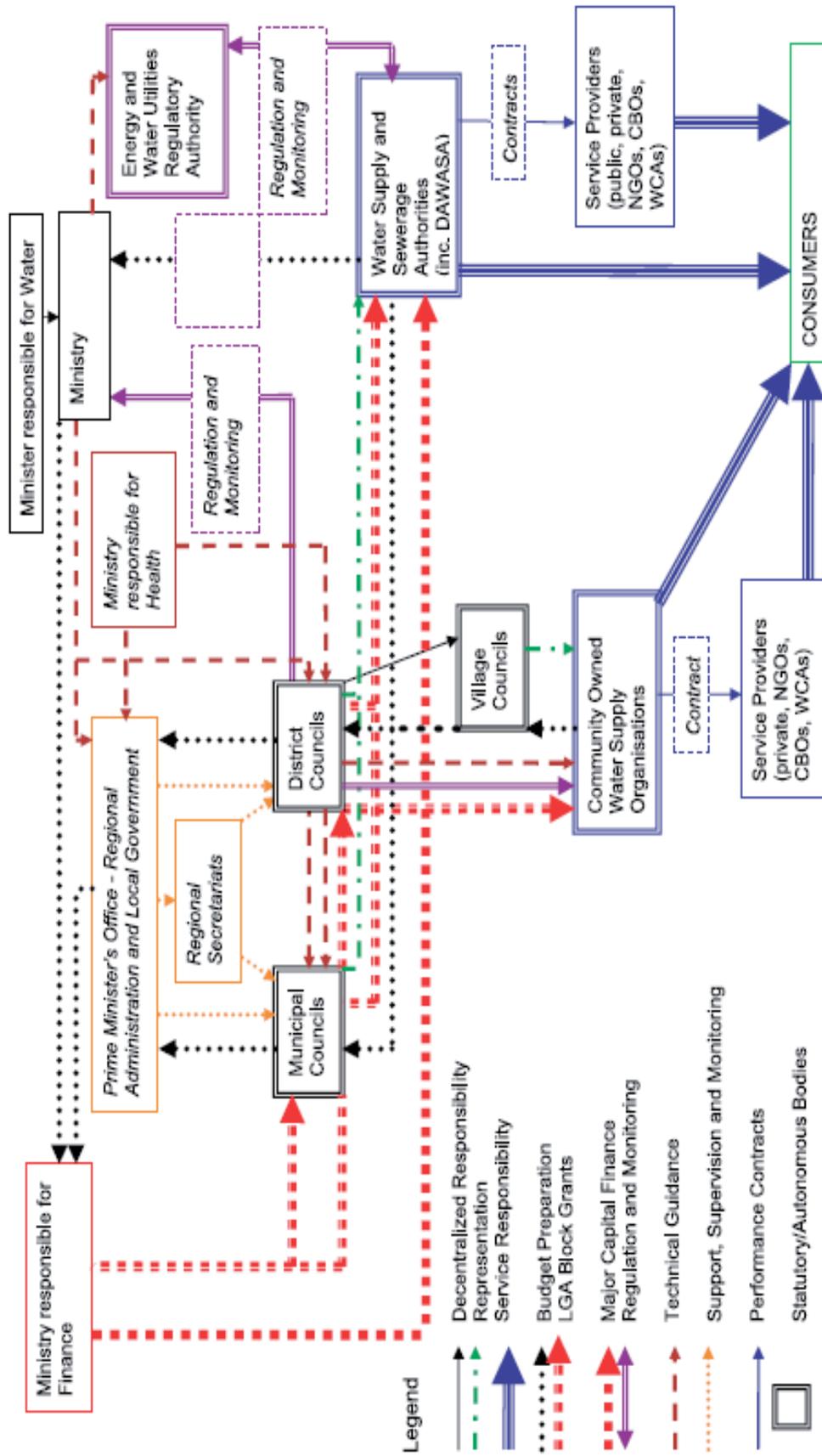
Table 2: Functions and Responsibilities for Water Resources Management in Tanzania

INSTITUTION	FUNCTIONS AND RESPONSIBILITIES
Minister responsible for Water	<ul style="list-style-type: none"> a) Presents national policy and strategy to the Government. b) Ensures policies and strategies are implemented. c) Appoints Chairman and members of Basin Water Boards. d) Determines appeals from all levels in framework.
Ministry responsible for Water	<ul style="list-style-type: none"> a) Sectoral co-ordination, monitoring and evaluation. b) Determine policy legislative aspects of integrated water resources management. c) Establish the National Water Board d) Formulates technical standards and WRM guidelines in consultations with stakeholders. e) Co-ordinates trans-boundary water issues. f) Ensures dam safety. g) Water Quality Monitoring. h) Development of water resources of national interest and safeguard national interest on Trans-boundary water resources. i) Co-ordinates data collection and assessment of water resources. j) Establish, supervises, coordinates, monitors and evaluates Basin Water Boards. k) Supervises the Water Resources Institute (Agency). l) Supervises the Drilling and Dam Construction Agency.
National Water Board	<ul style="list-style-type: none"> a) Evaluate existing and proposed policies and activities of the Government ministries and agencies relating to the allocation, management and protection of water resources and, on the basis of that, formulate policies and programmes aiming at management and development of water resources and pollution control. b) Ensure that water resources management operates according to the principles of environmental sustainability. c) Maintain a National Water Register in accordance with section 71. d) Determine investment priorities and financing patterns and coordinate and harmonize externally funded projects and programmes affecting water resources. e) Recommend to the Minister legislative measures for the management of water resources and effective control of pollution. <p>Advises the Minister on:</p> <ul style="list-style-type: none"> a) Integration of inter-sectoral planning. b) Co-ordination of basin planning and management. c) Inter-sectoral/inter-basin conflicts. d) Investment priorities and financing patterns. e) Inter-basin water transfer f) Trans-boundary water resources management
Basin Water Boards	<p>Through basin water office, carries out the following:</p> <ul style="list-style-type: none"> a) Prepare basin water resources management plans, projects, budgets and implementation strategy. b) Integrate district plans into basin water resources management plans. c) Implement water resources management projects and programmes in the basin d) Data collection, processing and analysis for WRM monitoring and resource assessment. e) Maintain and update assessments of availability and potential demand for water resources f) Co-ordinates technical aspects of trans-boundary issues in the basin and advice the Minister/Ministry accordingly. g) Co-ordinate and approve basin WRM planning / budgets. h) Approve issue and revoke water use and discharge permits. i) Enforce water use permits and pollution control measures. j) Co-ordinate the inter-sectoral water resources management at the basin level and serve as a channel of communication between these sectors and water users in general. k) Resolve intra-basin conflicts and co-ordinate stakeholders. l) Appoint the chairperson and members of the catchment and sub-catchment committees in respect to Sections 18-21. m) Maintain a Water Register in accordance with Section 70
Catchment / Sub-catchment Water Committees	<p>Shall have such powers and functions as may be delegated by the Basin Water Board, such as:</p> <ul style="list-style-type: none"> a) Coordination of catchment/sub-catchment integrated water resources management and planning. b) Resolution of water resources conflicts in the catchment/sub-catchment, and other delegated responsibilities from Basin Water Board.
Regional Secretariat	<p>Representation on Basin Water Boards.</p>
District Councils	<ul style="list-style-type: none"> a) Representation on Basin Water Boards. b) Representation on Catchment Committees. c) Formulate and enforce bylaws d) Promote efficient water utilization e) Preparation of district plans
Water User Associations	<p>A Water Users Association may be established by the agreement of the majority of a group of water users for one or a combination of the following purposes:</p> <ul style="list-style-type: none"> a) Manage allocation and conservation of water from a source used jointly by the members of the association (at local level). b) Acquire and operate any Permit under the provisions of the Act (2008). c) Resolve conflicts between members of the association related to the joint use of a water resource. d) Collect water user fees on behalf of the Basin Water Board. e) Represent the special interests and values arising from water used for a public purpose, such as in an environmental or conservation area, or for the purpose of managing a Groundwater Controlled Area.

Figure 3.1: New Institutional Framework for Water Resource Management



4.3.8. Fig. 6: The proposed institutional set up for water supply, sewerage and sanitation in Tanzania



Source: National Water Sector Development Strategy 2006 – 2015

4.3 Institutional arrangement

An organisation can be defined as a formal group of people with one or more shared goals, such as an association, group, club society, institute, union or party. It can also be a business in its various forms. An organisation is characterised by an organisational structure and by-laws that govern it. Institutions are organisations or establishments founded or for a specific purpose based on a set of working rules originating from an established custom, law or relationship in a society or community. It is important to distinguish between these two terms. Water User Associations, for example are both organisations and institutions: (Mutayoba et al 2006).

According to the NAWAPO 2002 the management of water resources in Tanzania will have five main levels; National level, Basin level, catchment level, District level, and Community or Water User Association level which will be the lowest level and will bring integrate users of the same source. The institutions are designed to facilitate involvement of the responsible authorities, relevant stakeholders and promote autonomy at the various levels

It is possible for two or more Water Users Associations operating in the same sub-catchment to unite and form a federation of Water Users. They provide legitimate representatives in Basin Boards and Catchment Committees.

5.0 Conclusion

Resolving the challenges in water governance is necessary if we are to achieve sustainable water resources development and management. If we are to secure access to water for all, maintain vital ecosystems and produce economic development out of water management, effective water governance is essential.

The concept of Integrated Water Resource Management has come to the fore as the means to ensure equitable, economically sound and environmentally sustainable management of water resources and provision of water services. Improving co-ordination and consultation, building partnerships and avoiding single-purpose strategies are essential to IWRM. IWRM requires a framework where the different and often competing water interests find a common ground and where multi-sectoral stakes are regulated and balanced.



TOPIC 3: IWRM Concept and Principles

(i) General Objective

To introduce participants to the concept of IWRM and its principles

(ii) Specific Objectives

At the end of this module facilitators will be able to :

- describe the meaning of IWRM and its main principles;
- explain the main reasons for promoting an IWRM approach;
- describe and appreciate the three IWRM specific objectives; efficiency, equity and environmental sustainability.

(iii) Contents

- Concept and Principles of IWRM
- Rationale for IWRM
- IWRM specific Objectives

(iv) Methodology

- Lectures
- Study tour in the Basin and outside the Basin
- Role Plays
- Q&A sessions
- Discussion Groups
- Group work

(v) Evaluation

- Ability to answer questions
- Participation in plenary discussions
- Reports from group discussions

1.0 Introduction

At its simplest, integrated water resources management is a logical and appealing concept. Its basis is that the many different uses of water resources are interdependent. **Integrated** management means that all the different uses of water resources are considered together. Water allocations and management decisions consider the effects of each use on the others (Hydropower, Irrigation, fishing, navigation, environmental considerations).

Management is used in its broadest sense. It emphasises that we must not only focus on development of water resources but that we must consciously manage water development in a way that ensures long term sustainable use for future generations.

Integrated water resources management (IWRM) is therefore a systematic process for the sustainable development, allocation and monitoring of water resource use in the context of social, economic and environmental objectives.

Figure 1: *Various water uses in a Typical Basin*



Dams for Hydropower/ Multipurpose uses



Environment



Irrigation



Fishing/navigation

2.0 Concept and Principles of IWRM

2.1 General Considerations

One gathers that IWRM contrasts with the sectoral approach that applies in many countries. We have already seen that when responsibility for different and competing water uses rest with many and varying agencies, lack of cross-sectoral linkages leads to uncoordinated water resource development and management, resulting in conflict, waste and unsustainable systems. So you see here that the IWRM involves a number of key issues: Sciences: hydrology etc, Technologies, Social Sciences, Policies, Legislations and allocation mechanisms, Livelihoods, Economics, Financing WRM and WRM Planning.

In Modules 1 and 2 we have discussed some of the key issues in WRM, mainly the water governance crisis, in which we saw that sectoral approaches to water resources management have dominated in the past and are still prevailing. The second concern was that of securing water for people, that although most countries give first priority to satisfying basic human needs for water, one fifth of the world's population is without access to safe drinking water and half of the population is without access to adequate sanitation. The third issue is concerned with securing water for food production (irrigation), that water is increasingly seen as a key constraint on food production and that in Tanzania over 90% of the allocated water is for irrigation purposes.

IWRM offers the prospect of greater efficiencies, water conservation and demand management equitably shared among water users, and of increased recycling and reuse of wastewater to supplement new resource development. Also protecting vital ecosystems is another important issue to look into while considering IWRM adoption. Terrestrial ecosystems in the upstream areas of a basin are important for rainwater infiltration, groundwater recharge and river flow regimes. IWRM can help to safeguard an “environmental reserve” of water corresponding with the value of ecosystems to human development. IWRM has a number of gender disparities in which we see that formal water management is male dominated. Though their numbers are starting to grow, the representation of women in water sector institutions is still very low. A crucial element of the IWRM philosophy is that water users, rich and poor, male and female, are able to influence decisions that affect their daily lives.

2.2 Guiding Principles for IWRM

The International Conference on Water and the Environment (ICWE) was held in Dublin, Ireland, in January 1992 was the most significant global conference on water since the United Nations Water Conference held in Mar del Plata, Argentina, in 1977. The Dublin Statement on Water and Sustainable Development is the most important document for water policy-making and implementation.

The four guiding principles of the Dublin Statement are (cited from the *International conference on water and the environment: Development issues for the 21st century*):

The Dublin statement in a nutshell recommended that; concerted action is needed to reverse the present trends of over consumption, pollution, and rising threats from drought and floods. The recommendations are for action at local, national and international levels, based on four guiding principles.

Principle No. 1 - Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment.

Since water sustains life, effective management of water resources demands a holistic approach, linking social and economic development with protection of natural ecosystems. Effective management links land and water uses across the whole of a catchment area or groundwater aquifer.

Principle No. 2 - Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels.

The participatory approach involves raising awareness of the importance of water among policy-makers and the general public. It means that decisions are taken at the lowest appropriate level, with full public consultation and involvement of users in the planning and implementation of water projects.

Principle No. 3 - Women play a central part in the provision, management and safeguarding of water.

This pivotal role of women as providers and users of water and guardians of the living environment has seldom been reflected in institutional arrangements for the development and management of water resources. Acceptance and implementation of this principle requires positive policies to address women’s specific needs and to equip and empower women to participate at all levels in water resources programmes, including decision-making and implementation, in ways defined by them.

Principle No. 4 - Water has an economic value in all its competing uses and should be recognized as an economic good.

Within this principle, it is vital to recognize first the basic right of all human beings to have access to clean water and sanitation at an affordable price. Past failure to recognize the economic value of water has led to wasteful and environmentally damaging uses of the resource. Managing water as an economic good is an important way of achieving efficient and equitable use, and of encouraging conservation and protection of water resources.

3.0 Pillars of IWRM

IWRM is anchored on three pillars; moving toward an enabling environment of appropriate policies, strategies and legislation for sustainable water resources development and management; putting in place the *institutional framework* through which the policies, strategies and legislation can be implemented; and setting up the *management instruments* required by these institutions to do their job (Jønych-Clausen). The three pillars are illustrated in Figure 2 below.

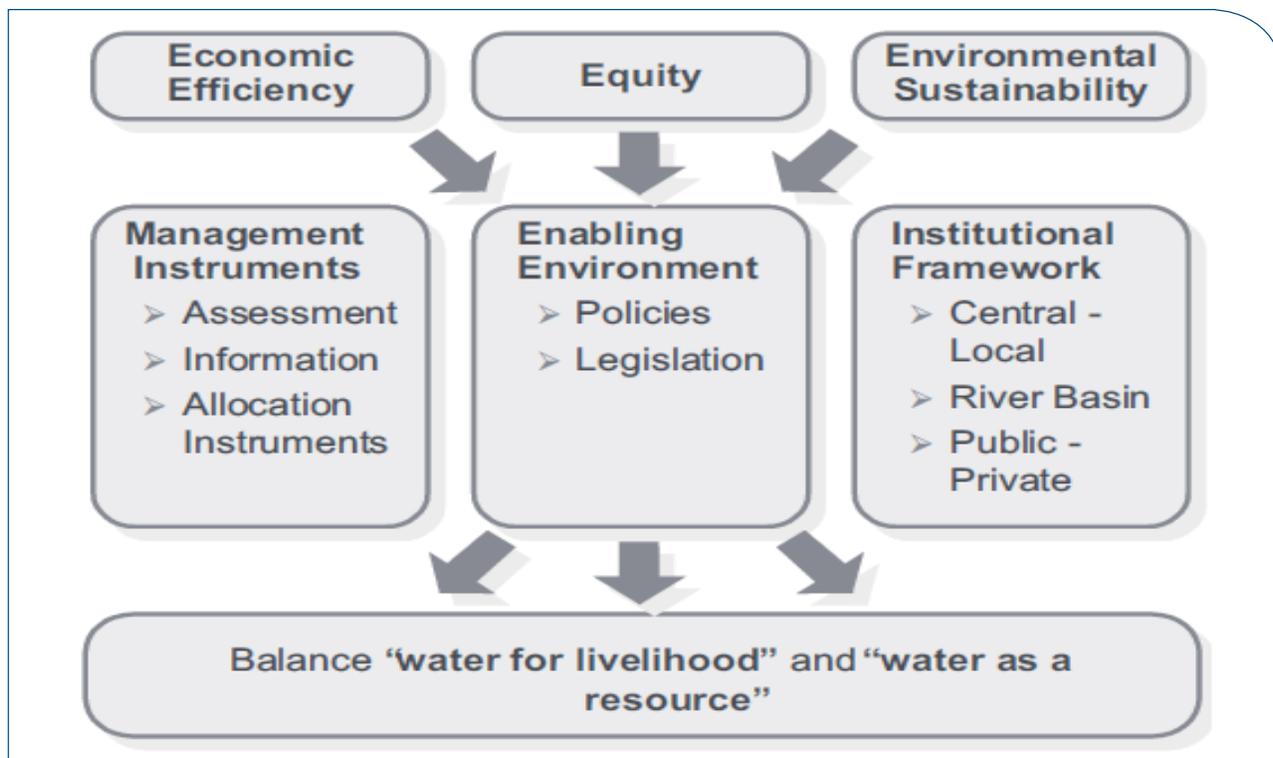


Figure 2: The “three pillars” of Integrated Water resources Management: Enabling, Institutional Framework and Management Instrumentas - Source Jønych-Clausen 2004

Integrated water resources management is based on the perception of water as an integral part of the ecosystem, a natural resource and a social and economic good, whose quantity and quality determine the nature of its utilization.

4.0 The Rationale for IWRM

From the previous modules we have already covered enough material to make us understand why the world has decided to adopt the IWRM concept. We have seen that water is vital for human survival, health and dignity and a fundamental resource for human development. The world’s freshwater resources are under increasing pressure yet many still lack access to adequate water supply for basic needs. Growth in population, increased economic activity and improved standards of living lead to increased competition for, and conflicts over, the limited freshwater resource. Here are a few reasons why many people argue that the world faces an impending water crisis:

- (i) Water resources are increasingly under pressure from population growth, economic activity and intensifying competition for the water among users;
- (ii) Water withdrawals have increased more than twice as fast as population growth and currently one third of the world’s population live in countries that experience medium to high water stress;

- (iii) Pollution is further enhancing water scarcity by reducing water usability downstream;
- (iv) Shortcomings in the management of water, a focus on developing new sources rather than managing existing ones better, and top-down sector approaches to water management result in uncoordinated development and management of the resource;
- (v) More and more development means greater impacts on the environment; and
- (vi) Current concerns about climate variability and climate change demand improved management of water resources to cope with more intense floods and droughts.

As for us in Tanzania the Water Policy of 1991, did not address itself to WRM issues and the Law was quite weak on aspects that are described by the guiding principles described above. The NAWAPO has made away for us to adopt the IWRM principles. The Water Resources Management Act when passed shall also aim at smooth implementation of the IWRM as stipulated in the NAWAPO and NWSDS.

5.0 IWRM specific Objectives

Integrated water resources management is based on the perception of water as an integral part of the ecosystem, a natural resource and a social and economic good, whose quantity and quality determine the nature of its utilization.

The IWRM framework, as developed by the GWP, consists of three Es - economic efficiency, equity and ecosystem sustainability. The three Es are somehow in competition. The IWRM challenges to integrate these three Es.

- (i) **Economic efficiency in water use:** Because of the increasing scarcity of water and financial resources, the finite and vulnerable nature of water as a resource, and the increasing demands upon it, water must be used with maximum possible efficiency;
- (ii) **Equity:** The basic right for all people to have access to water of adequate quantity and quality for the sustenance of human well-being must be universally recognized;
- (iii) **Environmental and ecological sustainability:** The present use of the resource should be managed in a way that does not undermine the life-support system thereby compromising use by future generations of the same resource.

6.0 Benefits from IWRM

6.1 Environment benefits

- Ecosystems can benefit from applying an integrated approach to water management by giving environmental needs a voice in the water allocation debate.
- IWRM can assist the sector by raising awareness among other users of the needs of ecosystems and the benefits these generate for them.
- The ecosystem approach provides a new framework for IWRM that focuses more attention on a system approach to water management: -protecting upper catchments, pollution control and environmental flows. It provides an alternative to a sub-sector competition perspective that can join stakeholders in developing a shared view and joint action.

6.2 Agriculture benefits

- Agriculture single largest user of water and the major non-point source polluter of surface and groundwater resources.
- IWRM can bring into the equation the reuse potential of agricultural return flows for other sectors and the scope for agricultural reuse of municipal and industrial wastewaters.
- For the agricultural sector IWRM seeks to increase water productivity within the constraints imposed by the economic, social and ecological context of a particular country.

6.3 Water supply and sanitation benefits

- The implementation of IWRM based policies should mean increased security of domestic water supplies, as well as reduced costs of treatment as pollution is tackled more effectively.
- Recognizing the rights of people, leads to the need to ensure proper representation of different groups on the bodies that make water resource allocation decisions.
- High pollution charges backed by rigid enforcement have led to impressive improvements in industrial water-use efficiencies in the industrialised countries, with benefits for domestic water supplies and the environment.
- Introduction of IWRM will improve the opportunity for introduction of sustainable sanitation solutions that aim to minimise waste-generating inputs, and reduction of waste outputs, and to solve sanitation problems as close as possible to where they occur.
- Can lead to greatly reduced costs of providing domestic water services, if for instance more irrigation schemes were designed with a domestic water component explicitly involved from the start.

7.0 Conclusion

In this module we have gone through the IWRM concept, why it is necessary and that although it is not an end in itself, yet it is a means of achieving three key strategic objectives. IWRM will assist nations like Tanzania to have good water governance. The basis of IWRM is that different uses of water are interdependent. The goal is to attain sustainable management and development of water resources. IWRM means that all the different uses of water resources are considered together. Water allocations and management decisions consider the effects of each use on the others.



TOPIC 4: Management Instruments in IWRM and Tools.

(i) Main Objective

To inform and equip participants with an understanding of water resources management instruments and tools required to implement the IWRM.

(ii) Specific Objectives

At the end of this module facilitators will:

- able to describe the major WRM instruments;
- Understand some common tools used for implementing and monitoring IWRM in a basin.
- Adopt and apply various WR Management Instruments

(iii) Training contents

- WRM Instruments under IWRM
- Management and tools in IWRM
- Examples of tools used and how to develop or acquire some tools.

(iv) Methodology

- Lectures
- Role Plays
- Q&A sessions
- Discussion Groups
- Group work

(v) Evaluation

- How participants answer questions
- Fieldwork reports
- Group reports in plenary presentations.

1.0 Introduction

There are eight of what is termed here as instruments for implementation of IWRM namely; water resource assessment , plans for IWRM (will be dealt with in Module 5), Efficiency in water use, Social change instruments , Conflict resolution, Regulatory instruments, Economic instruments and Information management systems

2.0 IWRM Instruments

The instruments are well covered in the NAWAPO which have the following specific objectives for WRM: (i) To develop equal and fair procedures in access and allocation of the water resources, (ii) to ensure that social and productive sectors, and the environment receive their adequate share of the water resources, (iii) to ensure effectiveness and efficiency of water resources utilization, (iv) to promote the management of water quality and conservation, (v) To improve the management and conservation of ecosystems and wetlands.

1.1 Water Resources Assessment – Understanding resources and needs

1.1.1 Importance of this Instrument

A water resources assessment involves taking a holistic view of the water resources in a given country, region, basin or catchment related to its use by society. The assessment looks at both the quantity and quality of surface and groundwater. It identifies the pertinent parameters of the hydrological cycle, and evaluates the water requirement of different development alternatives. The assessment pinpoints the major water resources issues and potential conflicts, their severity and social implications, as well as risks and hazards such as flood and drought. The understanding of the terrestrial and aquatic ecosystems is an essential element of resource assessment. A good water resources assessment needs to be based on good physical and socio-economic data.

Routine physical measurements at monitoring and gauging stations need to be made at appropriate times and with sufficient frequency to allow the assessment to draw valid conclusions. This in turn requires adequate financing of the monitoring system by government. Socio-economic aspects must include analysis of user behaviour, elasticity of demand, and the potential effects of demand management. Water resources assessment for IWRM sets hydrology in a wider context and considers social and economic development issues such as urban growth and changing land use patterns.

Modelling can be used to study impacts and trends resulting from various development options. However, for models to be useful in the pursuit of sustainable solutions, they must address and simulate not only economic efficiency and technical merits, but also the preferences and priorities of stakeholders. Models will only be truly useful when they are integrated into the local institutional and cultural context.

In order to do the assessment water management indicators are identified. This is important for the development of water policies, the setting of targets and goals and monitoring management performance. The appropriate combination of indicators helps to show how well IWRM objectives are being met, and if necessary, can provide a tool to help reformulate policies and programmes. Indicators support transparency and enable civil society and governments to judge performance. They can also be used for benchmarking, to encourage better performance from, for instance, water service providers, and in the use of yardsticks, a parallel technique that uses the performance of a similar organisation as an indicator of performance.

Environmental Assessment (EA) is a tool for anticipating the environmental effects of policy changes and new developments, enabling the incorporation of management or control measures into project and policy design. It is routinely used all around the world to improve the planning of projects and is increasingly being used to examine strategies, policies, plans, and sector programmes, when it is known as Strategic Environmental Impact Assessment (SEIA) or Strategic Environmental Assessment (SEA) in Tanzania the EMA provides for SEA.

1.1.2 Water Resources Assessment - Pangani Basin

Pangani Basin is one of the nine basins in Tanzania and is located in the North Eastern part of the country (Fig. 1). Its catchment area is 56,300 (Pangani River 43,650) km² (with about 5% of this area in Kenya), and has a population of about 4 million people most of who rely either directly or indirectly on agriculture for their livelihood. The river is about 500 km long and originates from Mt. Kilimanjaro (5,985 m) and Mt. Meru (4,566 m) which together create the Kikuletwa and the Ruvu rivers. These two rivers join to form the Pangani river which then passes through the arid Masai Steppe, draining the Pare and Usambara mountain ranges (Mkomazi and Luengera tributaries before reaching the estuary and Indian Ocean at the coastal town of Pangani (Fig. 2).

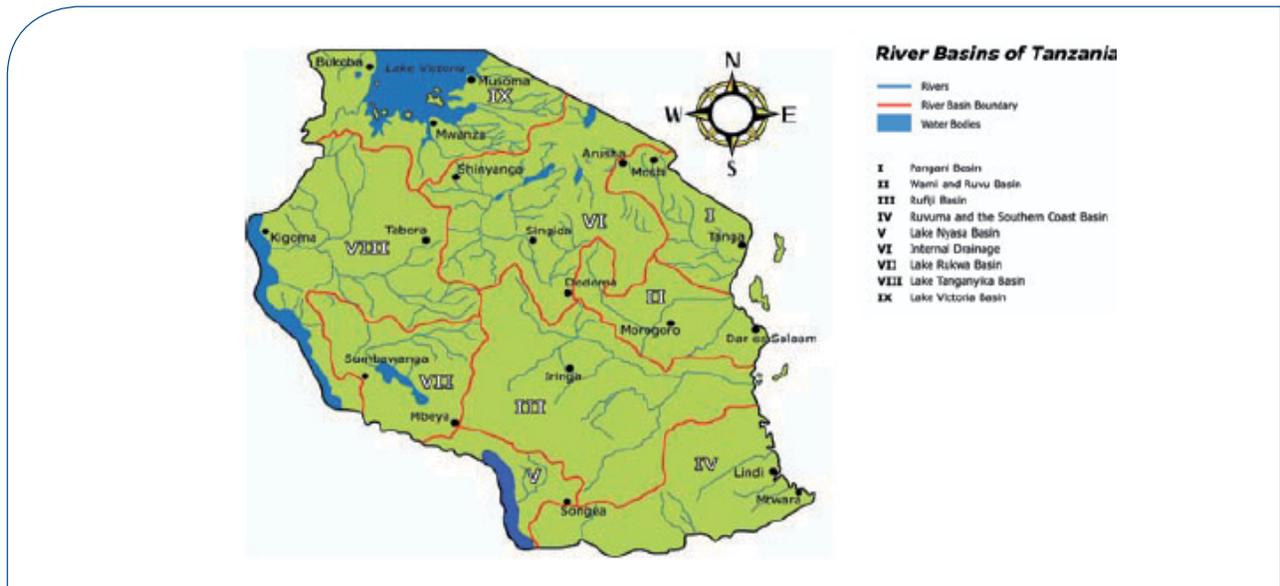


Fig. 1: The River/Lake Basins of Tanzania

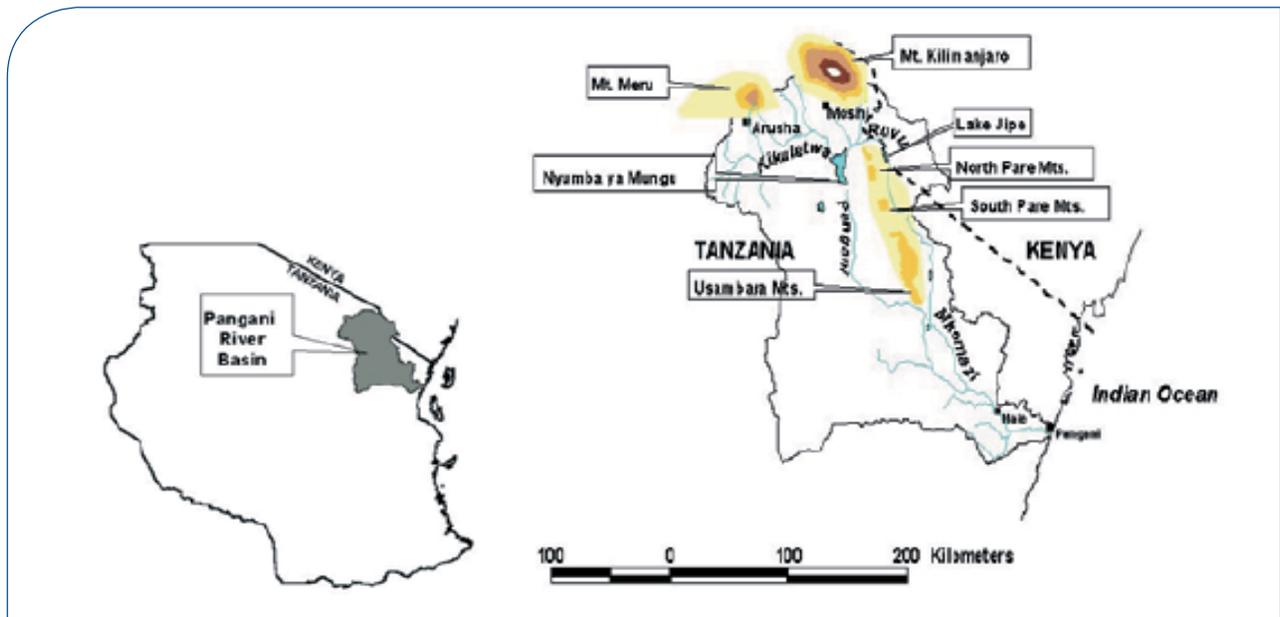


Fig. 2: The Pangani Basin

Pangani basin is one of the most productive areas of Tanzania with nationally important agricultural outputs, hydropower generation (almost 90% of the surface flow in the Pangani basin is used for irrigation and hydropower generation). The Basin has forest and biodiversity resources of global importance i.e. Eastern Arc Mountain Forests, Coastal Forest and Wetlands, Kilimanjaro, Arusha and Mkomazi National Parks/Game Reserves.

The Kikuletwa Sub-Catchment

The Kikuletwa sub-catchment is located on the north western part of the Pangani Basin covers an area of about 6,657 km². The sub-catchment is characterized by prominent mountains, lowlands and in few areas rolling topography (Fig. 3). The Kikuletwa sub-catchment contains six administrative districts, namely Simanjiro, Arumeru, Arusha, Hai, Moshi and Siha. The population is around 1,450,000 (2002 population census) and eight urban centers with a network of roads. Most of the people live in the

highlands and depends directly or indirectly on agriculture for their livelihood. Pastoralists are mainly found in the lowland areas of the sub-catchment. The sub-catchment has fifteen major streams/ rivers which rise on the slopes of Mount Meru and the southern slopes of Mount Kilimanjaro, (Fig. 4).

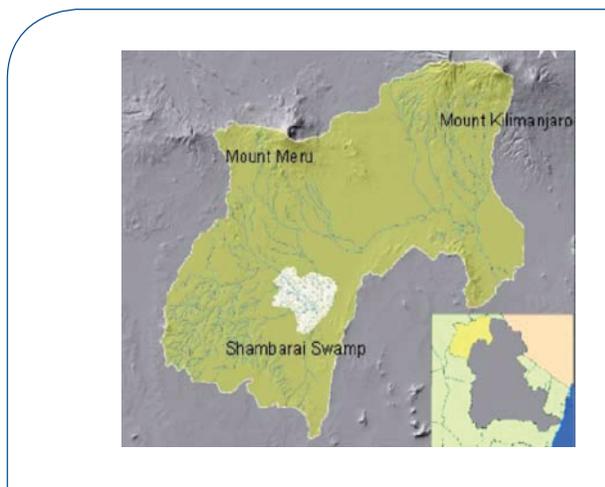


Fig. 3: The kikuletwa sub-catchment and its location in the Pangani Basin map

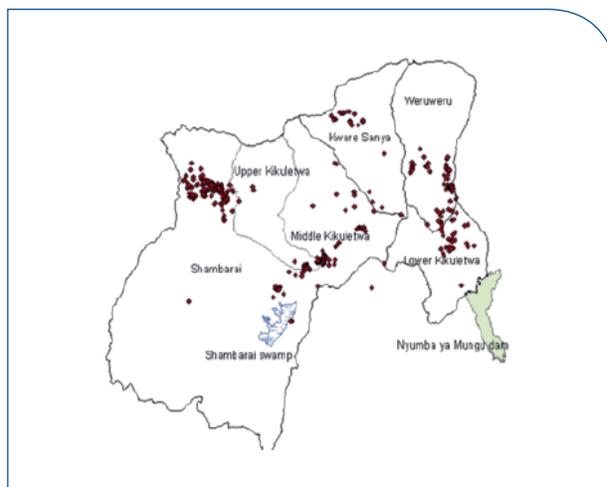


Fig. 5: Distribution of ground water sources (boreholes) in the kikuletwa sub-catchment

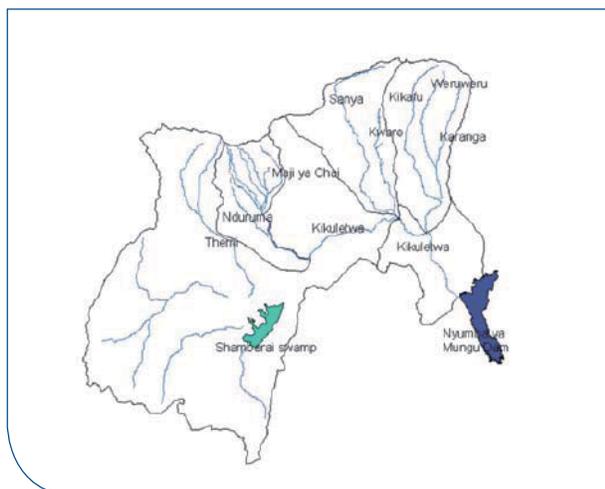


Fig. 4: Major rivers in the kikuletwa sub-catchment

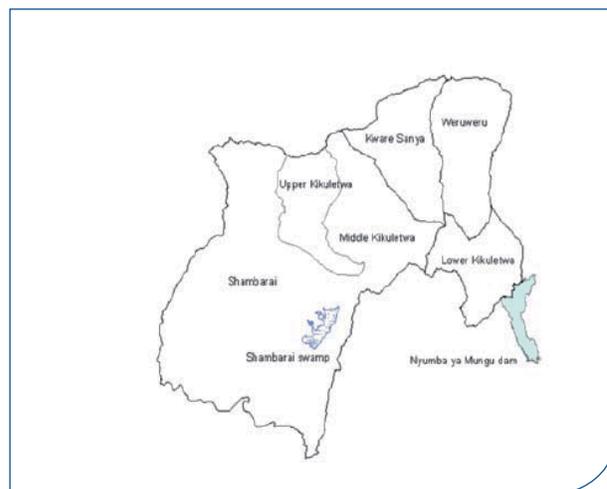


Fig. 6: Subdivided zones of the sub-catchment in terms of water use

The main rivers contributing water to Kikuletwa are Karanga, Kikafu, Weruweru, Longoi, Malala, Magdarisho, Ngarasero, Maji ya Chai, Tengeru, Kware, Sanya, Usa, Nduruma, Ngaramtoni and Them. At present water flowing from these rivers has decreased drastically and the little water flowing in them is used for different activities particularly irrigation in their respective areas.

On part of Land use practices, smallholder farming is dominant in the sub-catchment highland areas with typical farmers having some plots of coffee and bananas in the vicinity of their houses and some additional plots in the lowland areas for growing maize and beans. With the change of land use, people who live on the slopes of Mounts Kilimanjaro and Meru farm their land throughout the year. In lowlands things are different, there is livestock grazing with some areas left aside for subsistence farming.

As regards to surface water availability and amount of rainfall received annually as described in Topic 1. Water resources assessment done under River Basin Management and Smallholder Irrigation

improvement Project (RBMSIIP)1996 to 2002 has shown that this trend has not changed. In the sub-catchment there are two types of traditional furrows; the ones that prevail on the mountain slopes which are normally longer and have water throughout the year and the types which are found at lowlands which are normally shorter and most of them are seasonal.

Studies have shown that there is intensive groundwater use in the sub catchment. Boreholes are normally sunk 100-200m deep. The highest yield recorded in volcanic aquifer is in Arusha were up to 360 m³/h has been noted at Kiranyi borehole. However, the yield has been declining as has been recorded by Arusha Urban Water Supply and Sewerage Authority (AUWSA).

The Kikuletwa sub-catchment was subdivided into 6 relatively homogeneous zones in terms of water use. The zones are Weruweru, Kware Sanya, Lower Kikuletwa, Middle Kikuletwa, Upper Kikuletwa and Shambarai (Fig. 5).

In total in 2007 there were about 1,383 abstractions distributed as shown in Fig. 6 with a total amount of water abstracted standing at 19,069 litres/second. The table below shows the number of abstractions in each zone and the total amount of water assigned under different statuses, namely granted final, granted provisional, application and without water right.

1.2 Plans for IWRM – Combining Development Options, Resource Use and Human Interaction

An IWRM-oriented planning process takes a flexible and dynamic approach to planning the development and management of water resources. Planning reflects the total activity in the system, whether defined as river basin, catchment or watershed (interchangeable terms), including for example agriculture, forestry, mining and other land uses. The planning process acquires a special role in strengthening good governance within a strategic water management framework of goals, policies and planned actions to achieve the goals. IWRM identifies a basin as a planning unit. Module 5 explores more on this instrument.

1.3 Efficiency in Water Use –Managing demand and Supply

This instrument is basically important for the water demand and supply management. Demand management reflects a major shift in the approach to water resources management, away from traditional supply development (construction of physical infrastructure to capture more water for direct use) to an improvement in efficiency of use, conservation, recycling and reuse of water. Demand management examines changing demand and the way people use water in order to achieve more efficient and cost effective water use. It can help to reduce wasteful use of the resource, which represents an opportunity lost as well as the use of water without an economic purpose. Demand management can sometimes obviate the need for physical or infrastructure investments, providing real efficiency gains to society. Demand management works best in an IWRM framework which looks across sectors and makes proper links between policy instruments and impacts.

The key to improved efficiency lies in setting up mechanisms for changing people's attitudes and behaviour towards water use. Such mechanisms include - education and communication, economic incentives, including tariffs and charges for water use, Subsidies or rebates for more efficient water use can be useful, Regulations and by-laws, Technologies for reducing consumption which vary by application and context, *water audit*, which, by using simple procedures, can easily identify gross inefficiencies in water use in, for example, industrial plants.

Improved efficiency of use is achievable in almost all situations, but the specific tools vary widely according to circumstances for example, tariffs for water use are only effective if linked to volumetric use.

Efficiency is also ensured by providing a service that is used. Stakeholder dialogue helps tailor water management to meet the needs of society without waste. Ignoring the needs of special groups, such as women, youth or subsistence farmers means that both capital and operational investments are often wasted.

1.4 Social Change Instruments – Encouraging a Water-Oriented Society

Changing water practices to achieve IWRM requires changes in the deeply held attitudes of individuals, institutions, professionals and social organisations within civil society. By definition, social change instruments are not neutral; one person's positive change is often seen as destructive by others. Therefore it is important to ask, 'change from what to what?' as well as 'how can changes take place?' The key to encouraging an IWRM oriented civil society lies in the creation of shared visions, through joint diagnosis, joint creation of options, joint implementation, and joint monitoring. Participatory approaches in IWRM are powerful instruments for social change. This instrument is dealt with more in more details in another module.

1.5 Conflict Resolution–Managing Disputes, Ensuring Sharing Of Water

Procedures for consensus building and conflict management are central to successful IWRM. Conflicts can occur for many reasons. Areas for potential conflict include: interdependence of people and responsibilities; jurisdictional ambiguities; functional overlap; competition for scarce resources; differences in organisational status and influence; incompatible objectives and methods; differences in behavioural style; differences in information; distortions in communications; unmet expectations; unmet needs or interests; unequal power or authority; misperceptions, and others. Conflict is not always active: the poor and voiceless may already have 'lost' the dispute. Conflicts are inevitable in IWRM but need not end in polarisation or impasse. Conflicts can also be positive. We will learn more about this instrument in a separate lesson.



1.6 Regulatory Instruments – Allocation and Water Use Limits

We have seen while dealing with water governance issues that legal instruments are essential for any meaningful WRM. There are four basic types of regulatory instrument which have a role to play in integrated water resources management.

- (i) *Direct Regulations*, whereby government bodies or independent regulatory agencies establish laws, rules or standards which water and land users and water service providers are required to follow. This is often known as command and control regulation. Such regulations might, for example, include the specification of drinking water quality standards, controls over land use and development within catchments and flood plains, controls over the quantity and timing of private water abstractions, and controls over the quantity, quality and timing of waste discharges into the water environment.
- (ii) *Economic or market regulation* – economic instruments such as unit pricing, marketable rights or subsidies are employed instead of or in conjunction with direct regulations to influence water or land using behaviour.
- (iii) *Self regulation* – professional bodies, industry groups or community groups establish their own rules of conduct and mechanisms to ensure compliance. Governments may still have an important role, however, in allowing self-regulating systems to operate, in encouraging, enabling and building regulatory capacity and in providing vital information.
- (iv) *Social regulation* this involves changing water use behaviour through persuasion, information and education.

It is now widely accepted that all four of these sets of instruments will need to be employed within a mixed regulatory system. In water resources one will normally have regulations for water quality, water quantity and water services. Now it is widely applicable in a WRM function to include land use planning and nature (water source) protection. In Tanzania we have water quality standards and norms for observing water quantity all provided for in the Water Utilization Act. Water supply services are also regulated under EWURA. Of course a number of legislations are consulted here.

In Tanzania we use the water rights (water permitting) systems. There are different kinds of water rights but in Tanzania we use the right to the use of water system. Water right does not imply owning a source but essentially the right for use a certain amount of water for a specific water use purpose. The procedure to obtain the right of use of water as per ACP 331 is as follows:

- Application is made to the Basin Water Officer (the application forms are obtained from the BWO).
- The application is announced officially in the Government Gazette and at the District Administrative Office,
- Letters are written to invite for objections (from potential objectors) and information from various authorities and potential objectors mainly District Executive Director, District Agricultural and Livestock Development Officer, Environmental stakeholders etc),
- The application is taken to the BWB for discussion and decision making,
- After the deliberation of the BWB, the BWO informs the applicant about that decision by issuing a **provisional grant**, a statement of refusal or of deferring the application.

NAWAPO has the objective of having criteria for prioritization of water allocations so as to ensure that socio-economic activities and the environment receive their adequate share of the water resources on the basis of its availability, and to enable the sectors increase productivity, and to mitigate conflicts. So the NAWAPO states that in planning water uses, water for basic human needs in adequate quantity and acceptable quality will receive highest priority, water for the environment to protect the eco- systems that underpin our water resources, now and in the future will attain second priority and will be reserved. Other

uses will be subject to social and economic criteria, which will be reviewed from time to time. Utilization of trans-boundary water resources will be based on the principle of equity, right and rationality in accordance with agreements among the riparian state, and by respecting the principle of international obligations on trans-boundary water resource.

1.7 Economic Instruments – Using Value and Prices for Efficiency and Equity

Economic instruments can complement the use of institutional, regulatory, technical and other kinds of tools used in the water sector. In general, economic instruments involve the use of prices and other market-based measures to provide incentives to consumers and all water users to utilise water carefully, efficiently and safely. Economic instruments may offer some advantages over other tools, by providing incentives to change behaviour, raising revenue to help finance necessary adjustments, establishing user priorities and achieving overall IWRM management objectives at least overall cost to society. For successful application, economic instruments need appropriate standards (e.g. for discharges or surface water quality), effective administrative monitoring and enforcement capabilities, institutional co-ordination and economic stability.

Economic instruments work best in combination with other supporting measures; they are unlikely to be effective acting alone. The adage “the market is a good servant but a bad master” applies here. Water pricing is an increasingly common tool applied to recover costs, to give the right incentives to users, and to protect the environment. In practice, there is great variety in the type level and structure of tariff systems observed both between and within countries in the water services sector. We will learn more on this subject in a module specifically addressing financing issues, such issues as provided for in NAWAPO like water markets and tradable water rights or permits. .

1.8 Information Exchange – Sharing Knowledge for Better Water Management

There is definitely the need for accurate information to facilitate decision-making in water resources management. This information may come in many forms and styles, for example: written reports; biophysical, economic and social data, and first-hand experiences in implementing land and water management practices. An IWRM information exchange process allows professionals, practitioners.



It involves getting wide ranging and appropriate information into the hands of water professionals, especially those in government decision making agencies, and helping them to share information, ideas, and experiences. The process places importance on all relevant information sources, not just those from 'technical experts'. It engages local communities by providing opportunities for discussion and enables them to provide and gain access to information readily.

There are four broad types of information; all are involved in supporting IWRM:

- *Data* quantifiable and qualitative facts about the characteristics of water resources (such as quality, volumes, frequency of occurrence, spatial variability);
- *Information* interpreted data;
- *Knowledge* information held in the mind
- *Wisdom* (agreement about commonly accepted methods of using water resources to ensure sustainability).

To bring these together requires the systematic management of a wide range of materials. Information Management Systems have to be developed and managed in an organisation. Under WSDP the Ministry of Water and Irrigation is developing such systems for the ministry and for each basin. You will gather that these instruments have to be equipped with tools, termed IWRM tools.

3.0 IWRM Tools

Water managers have used the word tool in a broad sense for anything supporting an operational action (e.g. a guideline, a procedure or protocol, a method or technique, a device, or a software program) and the natural science community is slowly adopting this definition thereby remembering or accepting that the term "tool" covers much more than computer software. Here we shall use it to mean, tools (instruments), methods and techniques.

There are three "levels" of tools:

Level 1: Policy/guideline tools - which identify the activities at the sub level (*referred to as meta tools*).

Level 2: Activity tools - which identify specific tools (*essentially processes*).

Level 3: Specific tools - (*methods*).

Tools are developed for the end-user namely:

1. Scientists, who have the role as tool developer, advanced user, domain expert or can be reviewer of results.
2. Professionals/water managers who have the role as experienced tool users for decision-makers, and as mediators of results to decision-makers.
3. Water managers, here the same as the decision-makers, who are the ones who have to take actions and are responsible for their consequences.
4. Stakeholders who are persons, groups or organisations affected by a management plan.
5. Unorganised groups of individuals in the community who have a stake in the management of the river basin referred to as the *general public*.

Tools can be classified according to their nature in the following broad groups; a) Guideline, b) questionnaire or checklist, c) Database and GIS, d) Model code with simple relations, e) Model code with complex processes, f) Decision support system (DSS), g) Role playing game, h) Other undertakings which indirectly impact the WRM planning.

There are some common tools like the Global water Partnership IWRM Toolbox which is mainly a training tool. This toolbox is highly recommended. In the GWP tools three main areas of water use are considered; environment, agriculture and water Supply and Sanitation. In any case more areas can be considered and added depending on the basin specifics and on type of stakeholders in consideration.

4.0 Examples of tools used and how to develop or acquire some tools.

Some examples of tools used or developed in our country include:

- (i) hydrological models (Mike Basin, MODFLOW),
- (ii) decision support systems for Victoria, Ruaha Basin Decision Aid (for Rufiji Basin),
- (iii) River Basin Game (developed in the Rufiji Basin),
- (iv) Numerous role plays,
- (v) Teaching aids like the Kiswahili “Kitini cha Mafunzo ya Viongozi wa Jumuiya za watumia Maji Kuhusu Usimamizi na Matumizi Bora ya Raslimali za Maji” developed for the Rufiji Basin, Financial and Administrative guidelines and
- (vi) Policy, Laws, regulations, rules and constitution documents can also be treated as tools.

5.0 Conclusion

The concept of instruments and tools is an important one in implementing IWRM. Tools can be developed here in our country and can be customised to suit our local conditions. Implementing IWRM is a function which is characterised by the various instruments and tools. This can however be well implemented where IWRM plans are in place. The next module shall deal with IWRM plans.



TOPIC 5: IWRM Planning

(i) General Objective

Participants are expected to be equipped with knowledge and skills required to support a process leading to the development of an Integrated Water Resources Management (IWRM) plan which is both politically and socially acceptable and can be implemented.

(ii) Specific Objectives

At the end of this module facilitators will:

- Be able to describe basic principles of basin planning
- Be able to understand the relevance of IWRM plans to water resources management;
- Be able to identify the main stages in the planning cycle and understand, in a general sense, what they mean in the context of sustainable management of water resources;
- Appreciate the different activities and the scale and scope of actions required to develop an IWRM plan.
- Be able to understand why the plan is necessary and the intermediate steps in the planning process for the National economy and food security.

(iii) Contents

- Principles of Basin Planning
- Preparing for basin planning;
- Basin planning process; and
- Implementing basin plan.

(iv) Methodology

Will apply the following methods in conducting the training:

- Lectures
- Role Plays
- Q&A sessions
- Discussion Groups
- Group work

(v) Method of Evaluation

Monitoring and evaluation will be accomplished through:

- Questions
- Fieldwork reports
- Group reports and in plenary presentations.
- Training evaluation reports by participants.

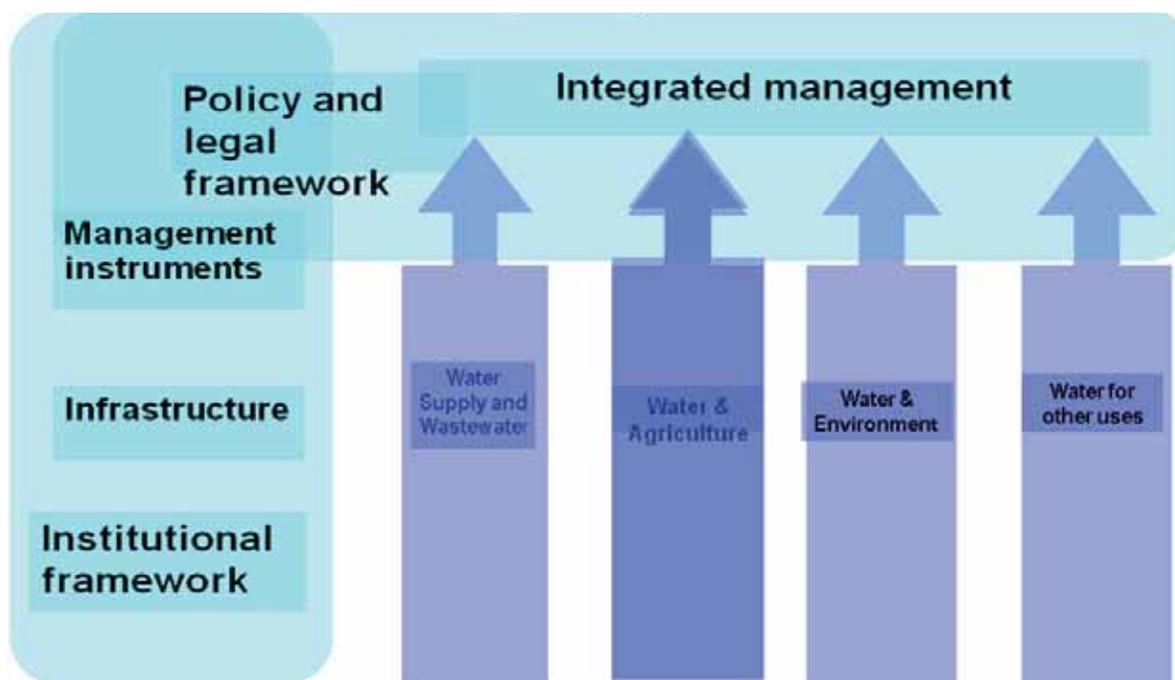
1.0 Introduction

IWRM requires that platforms be developed to allow very different stakeholders, often with apparently irreconcilable differences to somehow work together. Because of the existing institutional and legislative frameworks, implementing IWRM is likely to require reform at all stages in the water planning and management cycle. An overall plan is required to envisage how the transformation can be achieved and this is likely to begin with a new water policy to reflect the principles of sustainable management of water resources. To put the policy into practice is likely to require the reform of water law and water institutions.

Implementation of IWRM is best done in a step-by-step process, with some changes taking place immediately and others requiring several years of planning and capacity building. The linkages between water use sectors are so vivid that planning and working together is almost inevitable.

As we have heard, the water problems are many and solutions are urgent. However, those solutions need to consider the underlying social, economic and political forces involved and require changes that are not easy to reach. More commonly, the recognition that water problems are symptomatic of a deeper failure of water management systems leads to long term planning with an agenda for more sustainable use of water resources. The identification of water as a key factor in poverty reduction and sustainable development also drives national planning on water.

IWRM AND ITS LINKAGE TO SUB SECTORS



- Source : IWRM Toolbox

2.0 Basic Principles of Basin Planning

Simply put a river basin plan is an action plan for the integrated management of the water and related land resources in the basin. The Basin Plan is in the area of strategic planning. It will have details of actions and broad budgets as well as strategic elements. The plan will normally be relevant for several years. It will be brought into an operational plan only when the River Basin Organisation or other agencies take up the plan for actual implementation and incorporate it into their annual work plans accompanied by specified actions and detailed budgets.

IWRM planning means:

- 1) Moving from sector based planning towards coordinated or fully integrated planning for water, land and related resources;
- 2) Moving from a view that the state alone is the one responsible for water and land resources management towards one that promotes shared responsibility with society as a whole;
- 3) Moving from a centralized and controlled decision-making towards sharing result and opportunities, transparent negotiation, dialogue, cooperation and concerted action among stakeholders;
- 4) Being strategic i.e. seeking solutions that address the causes of water and land problems rather than symptoms.

It is worth noting that meaningful stakeholder participation in the development and implementation of the IWRM plan is critical. (Stakeholder participation will be covered in detail in a separate module). However, experience shows that the development and implementation processes of IWRM plan are facilitated by: strong political will, a clear distribution of roles and responsibilities among the stakeholders, highly motivated drivers maintaining commitment throughout the process, exchange of knowledge and experience between countries at various stages of the process, setting clear milestones for the achievement, and monitoring and evaluation of the progress, performance and impact.

3.0 Preparing for a Basin Plan

(a) Why basin planning

The most powerful reason for planning at the basin level is to address priority water problems affecting society and to stimulate growth and development. Basin plans for water resources are therefore set within the realities of water availability, within the geographical and political context and will take into account all activities and developments requiring water or influencing the water resources, which include ecological requirements, water supply and sanitation, irrigation, land use and forestry, fisheries, hydropower and industrial use.

(b) Planning context

Water resources management is a process characterized by management of competing and conflicting interests and viewpoints. Leadership of the planning process rests with government, its agencies and authorities at basin level. Basin planning is a cross-sectoral process. Plans should also take account of potential hazard and the vulnerability of people and ecosystems to extreme events. Planning should link to indicators of performance or targets.

(c) Coordinating and decision-making across the hierarchy of scales

Therefore river basin planning requires integration across several planning scales. Possible levels of coordination include national government, administrative regions, basin level sector and local level

organisation. In some cases the River Basin Organisation will involve coordination of decision at a trans-national level.

(d) The Expected outcome out of the plan

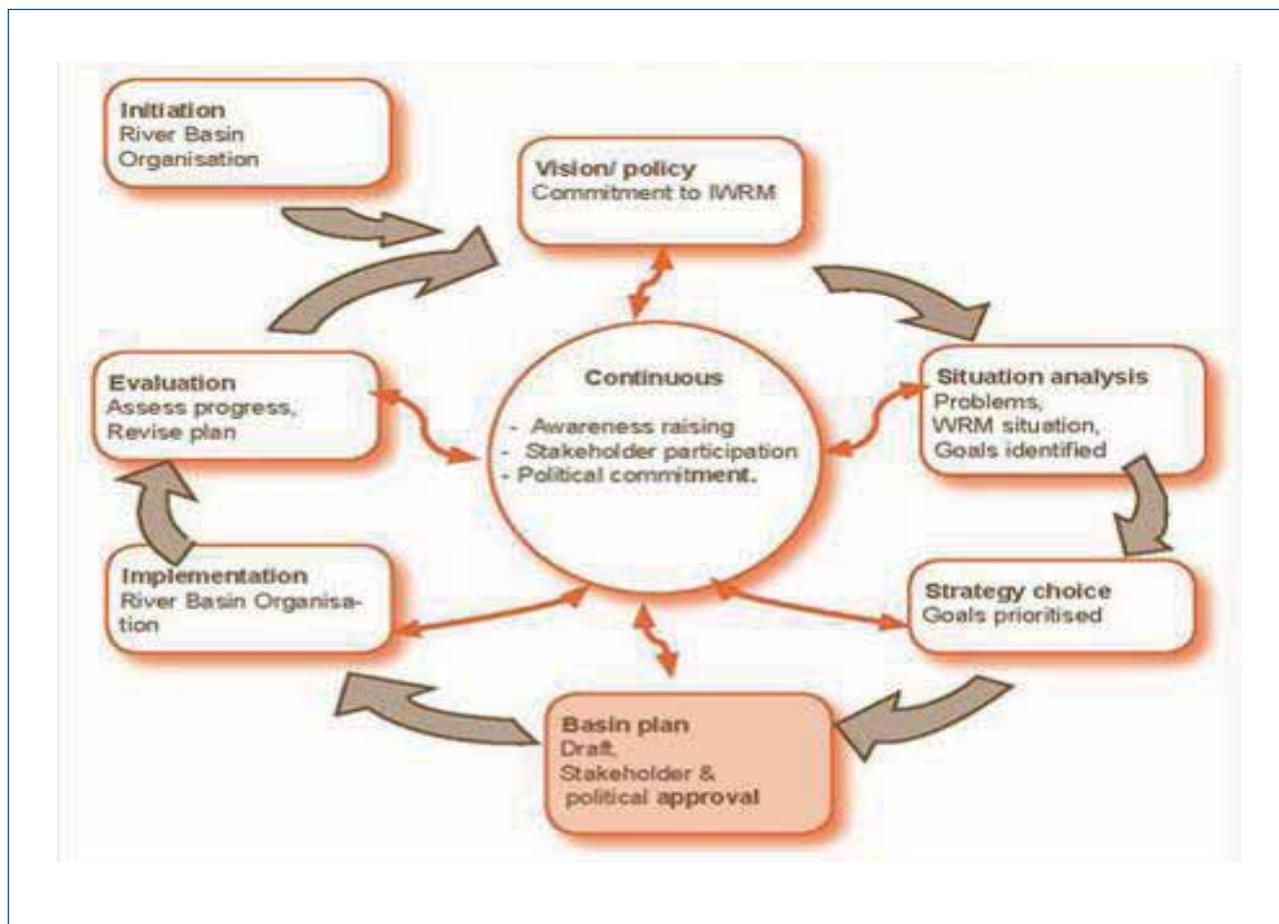
The outcome of the process will be a Basin Plan, endorsed by government and implemented by the river basin through its annual work plans. Another outcome will be stakeholders committed to the vision of water development in the basin. A third outcome should be improved water resources management.

4.0 Basin Planning Process

Planning is a process most effective when viewed as a continuous cycle. The planning cycle is a logical sequence of phases driven and supported by continuous management support and consultation events.

4.1 The initial stage

The process may be initiated external to the basin e.g. a requirement of the national water law, or from within the basin. Practically though, for a basin plan to be implemented it has to belong to the RBO or responsible government agency at the basin level who must be available to lead the process. Conclusive step for this phase will be the setting up of a team to develop the plan and agreeing on the process to be followed.



Source :Clausen 2005

4.2 Stakeholder Mobilisation

Mobilisation of stakeholders and political commitment all throughout the process is an important part of basin planning. Government agencies who have water interests and whose own plans impact on water management are important stakeholders. Political support is necessary for the adoption and implementation of the plan and it is advisable to build this commitment throughout the planning process and not leave it until the end. The issue of involving stakeholders will be explained in a separate topic.

4.3 Water resources management vision and policy

What follows is the development of the vision of the basin. A vision captures the shared dreams, aspirations and common view about the state, use and management of water resources in the basin in the long term. It is a statement of the long term goal. A water policy for the basin should be framed from the NAWAPO. Just a short document with clear statements is sufficient, covering such issues as environment, equitable access to water, maintaining a gender balance and sharing the benefits of water.

4.4 Basin characterisation – pressures, risks and impacts

Here we start from an understanding of the existing situation. Many elements can be considered in the situation analysis requiring technical and non-technical data from many sources. Consultation with stakeholders and various government entities is vital to understand problems in the basin, competing needs and goals in relation to the water resource management. Then the strengths and weaknesses in the water resource management in the basin are identified. Other aspects that should be addressed in order to improve the situation and reach the vision are also identified. The outcomes of the situation analysis are expected to include to, description of the situation, priority water management problems to be addressed; and a description of medium term goals for water management in relation to the situation analysis in specific areas such as water quality, economic areas, and other stakeholder issues.

4.5 Implementation strategy

The strategy is a transforming link between the problems and the desired goals for sustainable water resources management. Water strategy elaborates how the water vision will be achieved. It should go beyond the actions needed to solve current problems or achieve short term objectives and establish a clear long term framework to achieve sustainable management and development of water resources. It has to be in line with the National Water Sector Development Strategy (NWSDS) and other related national strategies.

1.6 Preparation of basin plan and adoption

Basin plans detail what has to be done, by whom, when and using what resources. The plans will also prioritise action based on significance of water use/need and impacts within the basin. The result at this stage is production of a river basin plan. The important thing is that whoever will undertake this task should be aware of the required outputs at all stages of the process. Consultants are often not sufficiently in touch with the realities of the basin and may produce a plan that is too idealistic. RBO in this case PBWO is expected to implement the plan.

A key part of any plan is the resources required for implementation. Here we are actually thinking of total financial requirements. The principles of cost recovery have been to be applied wherever possible. The Basin Board that is developing a business plan and financing strategy based on cost recovery and has the requisite autonomy is better placed to implement the basin plan than others.

5.0 Implementation of the Basin Plan

Development of the basin plan for water resources is not an end in itself. Plans derive meaning only if they are implemented and reviewed on a regular basis. A communication strategy for the plan and the planning process should be established as part of activities by the planning team. The final IWRM plan should be widely publicized and easily accessible.

6.0 Contents of a typical Basin Plan

A typical Basin Plan would contain but not limited to the following items.

Background

Here the following subjects may be included; Rationale, vision for basin water resources management, Progress for integrated water resources management, basin plan objectives, plan preparation and process constraints, structure of the plan and Link basin plan to national planning processes and/or plans.

Basin characterisation

Overview of the baseline conditions in the basin and draws out the key features of the catchment that have a bearing on the management of the water resources. It may also give an overview on the most urgent issues and prioritisation of the areas of intervention are included such as; Legal and institutional environment for WRM in the basin; Land use patterns and impacts; Hydrological and physical characteristics; Water uses and who are the users, how much they use and for what purposes; Conflicts and pressures on water resources; Water availability present and future/ water balances; Socio-economic context, stakeholders; Description of floods and droughts, the frequency of events; Conservation measures, risk and vulnerability analysis; Issues raised by stakeholders during the participation process; and Information management.

Strategies

A description of how to achieve the vision, goals, aims and objectives, either with direct reference to the water resources strategy or incorporating the relevant issues into the plan itself

Planning Intervention

Describes the activities over time to resolve problems and achieve strategic goal identified that may relate to RBO activities or those of other organisation within the basin including; Water Allocation and Water Use Management, Water Resource Protection, Catchment Conservation Strategy, Institutional Development Support, Water Infrastructure Development, Monitoring and Information Management, Financing and Implementation.

Resource plan

Here Financial requirements requirement and mobilisation strategy.

7.0 Conclusion

Basin Planning is new concept and have not been widely practiced in the world. Political will is vital in the IWRM plan processes and in its implementation. For IWRM to function properly in a basin, plans must be in place. The actual plans are quite cumbersome to prepare and the process is complex. The plans will be catchment oriented and involvement of stakeholders from the lowest levels of participation is anticipated. Participatory planning is dealt with in a separate lesson.

TOPIC 6: Climate Change and Adaptation Measures in IWRM

(i) General Objective

To equip participants with an understanding of climate change and adaptation measures .and how climate change can be incorporated in water resources management at all levels

(ii) Specific Objectives

At the end of this lesson the facilitators shall be able to:

- Explain the concept of climate change and the importance of addressing climate change manifestations in water management.
- understand climate adaptation measures in IWRM
- Describe the ways of incorporating Climate change adaptation measures in the IWRM plans.

(iii) Training contents

- The concept of Climate Change
- Adaptation to Climate Change and IWRM
- IWRM plans and Climate Change

(iv) Methodology

- Lecture
- Group Discussion
- Q/A sessions

(v) Method of evaluation

- Ask questions
- Trainees' questionnaire (evaluation forms).

1.0 Introduction: The concept of climate change:

Human-induced climate change represents one of the most serious global environmental problems. While the Earth's climate has always varied naturally over millennia, there is a scientific consensus that human activities are now changing global climate.

Climate change is real and happening now. Worldwide average surface temperatures have increased by an estimated 0.7°C (1.4°F) between 1900 and 2005. The past decade was the hottest of the past 150 years and perhaps the last millennium. The hottest 22 years on record have occurred since 1980, and 2005 was the hottest of all. This warming trend has been triggered by the emission of greenhouse gases such as carbon dioxide, methane, nitrous oxide and fluorocarbons. Human activities contribute to an increase of concentrations of greenhouse gases (GHGs). Activities include industrial processes, fossil fuel combustion and land use changes such as deforestation. This is what is now called global warming.

1.1 Greenhouse effect

The **greenhouse effect** is the heating of the surface of a planet or moon due to the presence of an atmosphere containing gases that absorb and emit infrared radiation. The phenomenon for which there is the ability of certain trace gases to be relatively transparent to incoming visible light from the sun yet opaque to the energy radiated from earth is what is termed the “greenhouse effect”. This is because the trace gases trap heat similar to the way that a greenhouse’s transparent covering traps heat. Without our atmospheric greenhouse effect, earth’s surface temperature would be far below freezing. On the other hand, an increase in atmospheric trace gases could result in increased trapped heat and rising global temperatures. The earth’s most abundant greenhouse gases are: water vapour, carbon dioxide, methane, nitrous oxide, ozone and CFCs (chlorofluorocarbons).

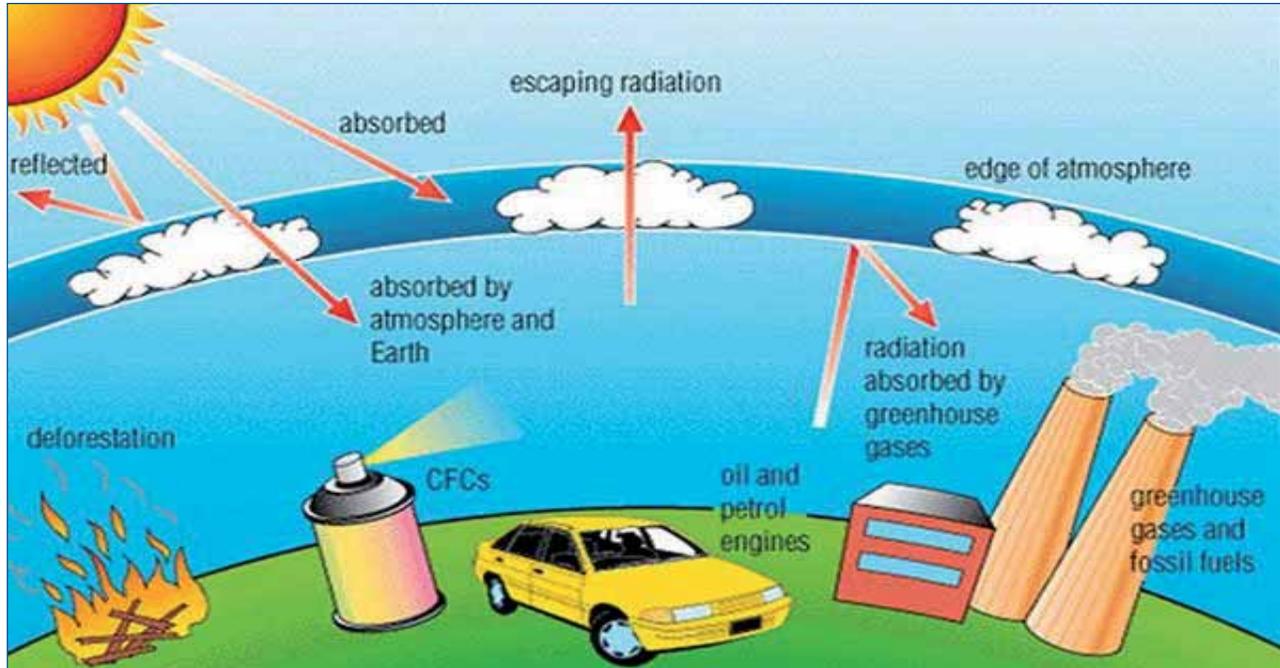
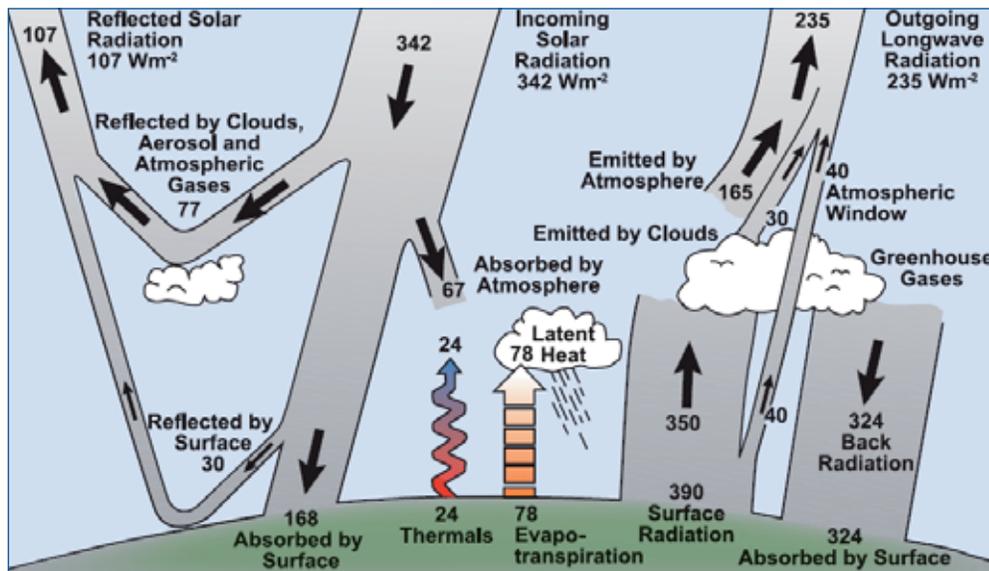


Fig 1(a) Pictorial Representation of Global Warming and Green house Effect (Source www.myclimatechange.net)



²FAQ 1.1, Figure 1. Estimate of the Earth’s annual and global mean energy balance. Over the long term, the amount of incoming solar radiation absorbed by the Earth and atmosphere is balanced by the Earth and atmosphere releasing the same amount of outgoing longwave radiation. About half of the incoming solar radiation is absorbed by the Earth’s surface. This energy is transferred to the atmosphere by warming the air in contact with the surface (thermals), by evapotranspiration and by longwave radiation that is absorbed by clouds and greenhouse gases. The atmosphere in turn radiates longwave energy back to Earth as well as out to space. Source: Kiehl and Trenberth (1997)

Figure 1: Green House Effect ²(Source IPCC)

1.2 Manifestations of climate change

Regardless of how fast or how much the climate will eventually change, it is already:

- (i) **Altering hydrological cycles.** In many semi-arid and arid regions around the world, less rain is falling, and that which does is evaporating faster due to climbing temperatures. Meanwhile, many areas which have long been susceptible to flooding are getting even more rain.
- (ii) **Altering weather patterns.** In other places, total rainfall hasn't changed so much, yet the timing and duration of rains has. In other words, seasons have become less predictable and, in many cases, more volatile.
- (iii) **Raising sea levels.** Melting ice caps are expected by conservative climate change models to result in an average sea level rise of 9 to 88 centimetres by 2100.
- (iv) **Increasing the intensity, and frequency, of extreme weather conditions and events such** as torrential rains, droughts, tropical storms, cyclones and hurricanes.

2.0 Climate change projections and effects

1.1 Climate change projections

- (i) Unusual weather events would likely increase, including for instance greater frequency and intensity of El Nino type of weather patterns. According to these projections, many territories will experience intensified rainfalls; more violent cyclones will intervene in tropical areas while mid-latitude continental regions would be at the risk of drought.
- (ii) Projections of future climate change as they relate to different aspects of water, are that there might be; changes in precipitation frequency and intensity; changes in average annual run-off impacts of sea level rise on coastal zones, water quality changes, groundwater changes
- (iii) Impacts on ecosystems. Developing countries appear to be more vulnerable to observed changes in regard to water resources, coastal zones, and health, because of their, geographical and climatic conditions, high dependence on natural resources lack of water infrastructure and constrained financial and technological capacity to adapt to changing climate.

2.2 Effects of climate change

Climate change changes have serious implications for water resources, food security, and the spread of diseases, the productivity of natural resources, sea level rise and desertification. In East Africa climate change will be directly felt in terms of (i) higher temperatures, (ii) changes in the timing and quality of rainfall (iii) an increase in the frequency of climate hazards such as floods, droughts, cyclones and tropical storms and (iv) sea level rise

2.3 CLIMATE CHANGE IMPACTS

2.3.1 Water availability

- (i) A devastating of effect of climate change in East Africa will be changes in frequency, intensity and predictability of precipitation. Changes in regional precipitation will ultimately affect water availability and may lead to decreased agricultural production and wide spread food shortages
- (ii) East Africa will experience warmer temperatures and a 5-20% increase rainfall from December to January and 5-10% decrease from June to August b y 2050. In other words some parts will see up to double precipitation and while semi-arid areas are likely to see less rain than at present.

- (iii) In Tanzania the timing of rainfall will become more less predictable and their intensity more volatile. The availability of fresh water in Tanzania is expected to decrease by over half from 1990 levels by 2025 (Sharma et al 1996)

These climate impacts will increase regions vulnerability to deforestation, loss of forest quality, degradation of woodlands, coastal erosion, coral bleaching and sea level rise.

- (iii) The annual flow of river Pangani and Ruvu rivers have been reduced by 6-9% and 10% respectively (VPO-URT 2003) due to declining regional rainfall which has had ecological and economic impacts such as water shortages, lowered agricultural production . Moreover, reduced runoff will diminish river flows and decrease the availability of water for irrigation and electricity generation.
- (iv) Complete disappearance of Kilimanjaro glaciers by 2015-2020. The Pangani basin is also fed by the glaciers of Kilimanjaro which have been melting alarmingly first.

2.3.2 Food security

Climate change is likely to affect food security by influencing livelihood productivity and opportunities. For the most part the impacts will be negative. The following are evident in East Africa:

- (i) Decline in long cycle crops and rainfall between March and may from 1996-2003
- (ii) El-nino rains produce abnormally high amounts of precipitation in parts of equatorial east Africa and can result in flooding and decreased agricultural yields (IPCC 2001)
- (iii) Warming temperatures may negatively affect some fisheries in the region
- (iv) In Tanzania agriculture is of central importance to livelihoods providing income and employment to 80% of the population. As the sector is dominated by rain fed subsistence production, food security is particularly vulnerable to climate variability and change. Maize yields are expected to decline by 33%



2.3.3 Human health

- (i) There is growing evidence to suggest that climate-driven threats to health are already on the increase. For example higher annual temperatures in high altitude communities such as those around Kilimanjaro and the Usambara mountains have been linked to expanding malaria transmission
- (ii) Climate change is expected to exacerbate the occurrence and intensity of future diseases outbreaks and may increase spread of diseases in some areas (IPCC 2001)
- (iii) Rainfall and unusually high maximum temperatures are positively correlated with the number of malaria cases (*Githeco and Ndegwa 2001*)
- (iv) Climate change resulting in warm and rainy days can lead to coincidences of Malaria events. Temperatures affects the development rates of vectors and parasites while rainfall affects the availability of mosquito breeding sites.

2.3.4 Extreme Weather events

- (i) Extreme events are likely to pose the greatest climate change threat to Africa (WGCCD 2005). Warming temperatures are projected to cause more frequent and more intense extreme weather events such as heavy rainstorms, flooding, fires, hurricanes, tropical storms and el-nino events (IPCC 2001)
- (ii) In Tanzania extreme events are likely to take form of drought, flooding, tropical storms and cyclones which are expected to become more frequent, intense and unpredictable (IPCC 2003)
- (iii) Extreme weather conditions such as drought and sudden events such as El-nino episode of 1997-98 highlights the country's vulnerability to current climatic hazards

1.1.5 Sea level rise

- (i) As global warming causes polar ice caps to melt, the IPCC predicts sea level rise of 8-96 cm by 2100.
- (ii) Warm sea surface temperatures, more extreme weather events and sea level rise will lead to the destruction of coral reefs which are crucial for coastal protection (IPCC 2001). Coral reef loss is a significant cause of coastal erosion
- (iii) Mangroves are at threat from deforestation, coastal erosion and extreme weather and have been identified as one of the most vulnerable species to sea level rise and inundation
- (iv) With 800 Km coastline and a coastal population of 16%, sea level rise is likely to have a considerable impact on Tanzania's coastal communities and the ecosystem they depend on for their livelihoods. Regions to be hard hit include Dar-es-salaam (0.5 and 1m rise), Coastal region, Mtwara and Lindi.

Other impacts in Tanzania include

- (i) *Land loss of 247-494 square Kms based on sea level rise of 0.5 and 1m respectively*
- (ii) *Coastal erosion damage to coastal structures and properties*
- (iii) *Loss of coastal and marine ecosystem (e.g mangroves, fish, coral)*
- (iv) *Saline intrusion in fresh water bodies e.g Rufiji and Pangani*
- (v) *Inundation of low lying coastal areas*

2.3.6 Biodiversity

- (i) Climate change is already having an impact on the dynamics of African biomes and its rich biodiversity, although species composition and diversity is expected to change individual species response.
- (ii) The projected rapid rise in temperature combined with other stresses such as the destruction of habitats from land use change, could easily disrupt the connectedness among species, transforming existing communities and showing variable movements of species through ecosystems which could lead to numerous localized extinctions.
- (iii) Climate change is expected to significantly alter African biodiversity as species struggle to adapt to changing conditions.
- (iv) Climate projections suggest that during already dry months, less precipitation will occur, reducing the resilience of plants

3.0 Water Resources and Climate Change

Assessment of impact of climate change on water resources and identification of adaptation strategies requires consideration of both its biophysical and socioeconomic aspects. Integrated water resources management (IWRM) provides an ideal platform to carry out these tasks.

IWRM provides a policy and decision making framework for water resource management actions. It provides the planning framework for water and an IWRM approach provides a system for stakeholder consultation and interaction. It is important to address climate change manifestations in water management because of;

- (i) Impacts of climate change on freshwater systems.
- (ii) The number of people in severely stressed river basins is projected to increase significantly.
- (iii) Semi-arid and arid areas are particularly exposed to the impact of climate change on freshwater.
- (iv) Higher water temperatures, increased precipitation intensity and longer periods of low flows lead to more pollution and impacts on ecosystems, human health and water system reliability and operating costs.
- (v) Climate change affects the function and operation of existing water infrastructure and water management practices.
- (vi) Adaptation procedures and risk management practices for the water sector are being developed.



4.0 Mitigation of Climate change

- (i) Reduce GHG emissions: projects aiming to reduce GHGs typically swap inefficient and dirty energy technologies for more efficient and cleaner alternatives. Promotion of fuel efficient stoves and biogas systems in communities.
- (ii) Actively sequester GHGs in sinks: Sequestration projects seek to capture and store carbon. They can target carbon dioxide that would otherwise be emitted by large scale power plants. They can also pull carbon dioxide out of the atmosphere and lock it up in trees, other vegetation and soil.
- (ii) Protect threatened carbon sinks: Establish projects to protect threatened carbon sinks.

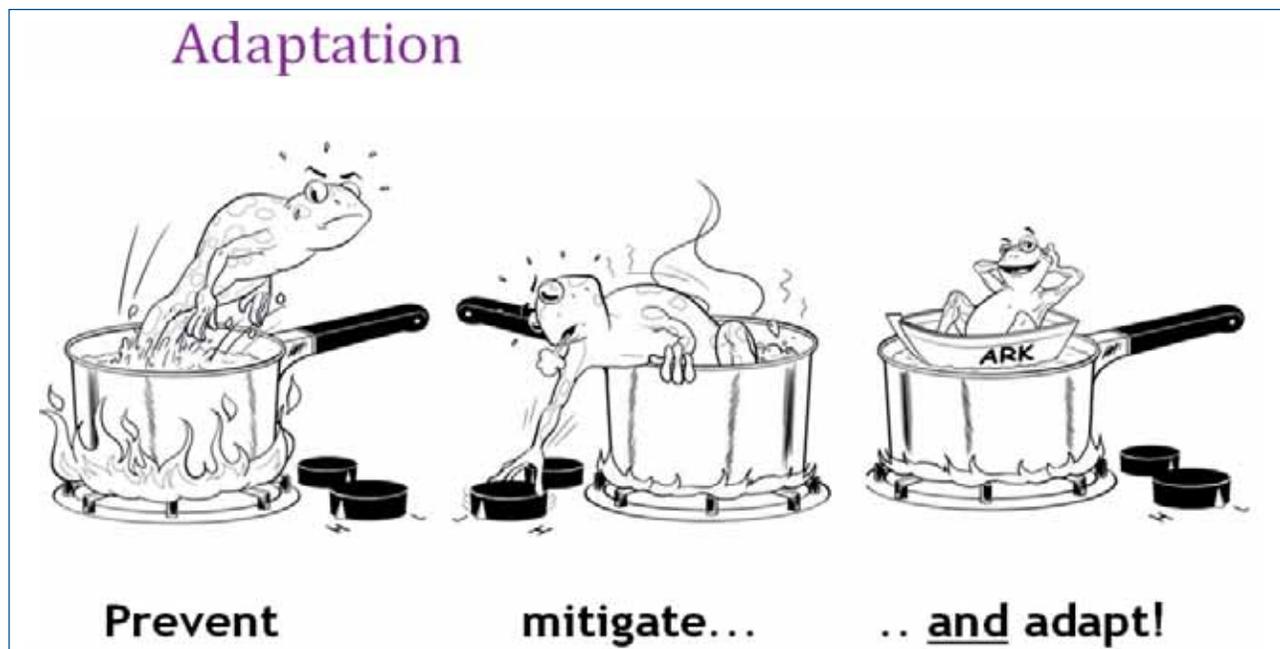
5.0 Adaptation to Climate Change and IWRM.

The effects of climate change are already being felt by many of the world's poorest communities. Climate change is an inevitable part of our future. It is therefore, crucial that adaptation form a central part of the world's response to climate change.

According to IPCC (2001), **adaptation** can be defined as “*adjustment in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts*”. This term refers to changes in processes, practices, or structures to moderate or offset potential damages or to take advantage of opportunities associated with changes in climate.

It is important to address climate change manifestations in water management because of, impacts of climate change on freshwater systems, the number of people in severely stressed river basins is projected to increase significantly, semi-arid and arid areas are particularly exposed to the impact of climate involves adjustments to reduce the vulnerability of communities, regions, or activities to climatic change and variability.

It thus differs from **mitigation**, which can be defined as “*an anthropogenic intervention to reduce the sources or enhance the sinks of greenhouse gasses*”.



Adaptation to climate change and variability, in fact means, adaptation to extremes. Future hydro-climatic regimes will be different from the present-day ones. This graph shows a probability distribution of climatic attributes, or effects. Without climate change, we can more or less rely on a predictable range in variation, resulting in a combination of autonomous adaptation and planned adaptation measures. However, we now face a higher probability of extreme events.

5.1 Possible Adaptation Measures

Adaptation is required in a situation of water stress, water quality risks, at different levels for instance transboundary level or basin level. Adaptation is required for typical functions of water resources management (water allocation, pollution control; monitoring; basin planning; economic and financial management; information management; organisation of stakeholder participation; flood and drought management).

Table 1: Water Resources Management Adaptation Measures

Possible adaptation measures	IWRM function	Anticipated effect
Water pricing, cost recovery, investment	Economic/financial management	Reduced per capita consumption Improved efficiency
Seasonal water rationing, re-allocation, managing water use	Water allocation Pollution control	Availability and access improved Uninterrupted flow Purification function secured
Flood and drought risk mapping, infrastructure, scenario development	Basin planning	Reduced impact of extreme events
Increase capture and storage of surface runoff	Basin planning	Improved availability Reduced polluters in the system
Water pricing, cost recovery, investment	Economic/financial management	Reduced per capita consumption Improved efficiency
Seasonal water rationing, re-allocation, managing water use	Water allocation Pollution control	Availability and access improved Uninterrupted flow Purification function secured
Flood and drought risk mapping, infrastructure, scenario development	Basin planning	Reduced impact of extreme events
Increase capture and storage of surface runoff	Basin planning	Improved availability Reduced polluters in the system

And although climate change might be a global phenomenon, it is clear that the real problems will be local and that somehow adaptation is necessary.

6.0 Conclusion

IWRM has been described as the most holistic and effective method that represent different and often competing players and components of the system. Although climate change might be a global phenomenon, the real problems will be local and that somehow adaptation is necessary. We have also seen that there are several ways of adaption to climate change for water resources issues. With respect to policies, it is interesting to see that the concepts that are incorporated into integrated water resources management plans, integrated flood management plans and integrated coastal zone management plans allow also for adaptation measures to include impacts of climate change. So it is necessary to include climate change aspects in our basin plans.

TOPIC 7: The Contribution of Integrated Water Resources Management (IWRM) in Poverty Reduction

(i) General Objective

To assist the participants' to understand and appreciate the contribution of IWRM has on poverty reduction initiatives in the catchment, basin and the nation at large.

(ii) Specific Objectives

At the end of this lesson the facilitators will be able to:

- describe the linkages between IWRM and the various global policies and strategies on poverty reduction such as the PRSP, MDGs etc
- identify key roles water plays towards poverty reduction and eradication.
- promote opportunities to reduce poverty through water management at catchment level
- pick ongoing initiatives in the Kikuletwa, on water resources management and development which are focused on poverty reduction for communities living there.

(iii) Contents

- IWRM - Poverty nexus in the International Arena
- Poverty Reduction and water Management (roles of IWRM in Poverty reduction)
- Opportunities to reduce poverty through water Management
- IWRM based initiatives on poverty reduction in the KC
- Policy Recommendations

(iv) Methodology

- Short lecture
- Group Discussion
- Plenary discussion
- Q/A sessions
- Visual aids

(v) Evaluation

- Ability of participants to answer questions
- Quality of group representations
- Plenary contributions

1.0 Introduction

Better water management can make a key contribution to poverty reduction. Improving the water security of the poor people will help reduce poverty and support sustainable development in direct and material ways.

Water is essential for the food security of the poor, not just from agriculture but also from trees and home gardens, from fish and other foods collected from aquatic ecosystems and from livestock. Water is an essential input into many livelihood activities, including manufacturing and services, and improved access to water for both urban and rural poor can create livelihood opportunities that can break the cycle of poverty. A more complete understanding of the relationship between water security and poverty reduction is needed to improve the management of water resources and the delivery of water services.

1.1 What is poverty?

Poverty is the condition of lacking full economic access to fundamental human needs such as food, shelter and safe drinking water. While some define poverty primarily in economic terms, others consider social and political arrangements to be intrinsic. Causes, effects, and measurement of poverty directly influences the design and implementation of poverty reduction programs, and is thus important to the fields of international development and public administration. Poverty is a condition which may affect individuals or collective groups, and is not confined to the developing nations.

Economic aspects of poverty may focus on material needs, typically including the necessities of daily living, such as food, clothing, shelter, or safe drinking water. The World Bank defines *extreme poverty* as living on less than US\$ (PPP¹) 1 per day, and *moderate poverty* as less than US\$2 a day, estimating that “in 2001, 1.1 billion people had consumption levels below US\$1 a day and 2.7 billion lived on less than \$2 a day.”

In politics, the fight against poverty is usually regarded as a social goal and many governments have institutions or departments dedicated to tackling poverty. In the current decade, the importance of strong and functioning states to poverty reduction is more widely recognised. Water management is a key factor in the global battle to remove the scourge of extreme poverty and to build secure and prosperous lives for hundreds of millions of people in the developing world.

¹ The **purchasing power parity (PPP)** theory uses the long-term equilibrium **exchange rate** of two currencies to equalize their **purchasing power**. Developed by **Gustav Cassel** in 1920, it is based on the **law of one price**: the theory states that, in ideally efficient markets, identical goods should ve only one price.

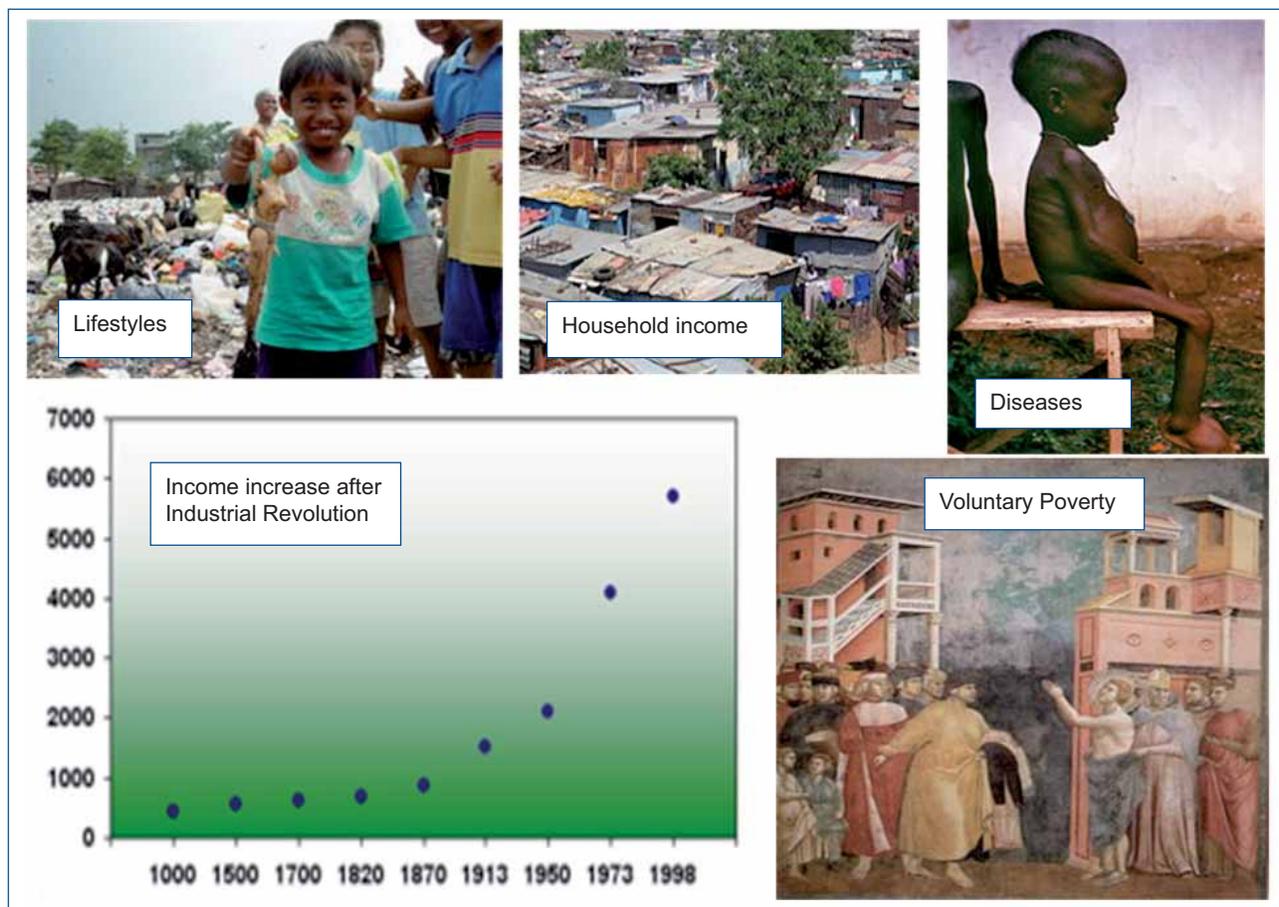


Fig. 1: Some Illustrations of Poverty

2.0 IWRM Poverty Nexus in the International Arena

2.1 General Observations

- (i) It was estimated that in 1998, 1,175 million people (1,183 million in 1987) survived on the equivalent of less than \$1/day, 23.4% of the world's population (28.3% in 1987), while 2,811.5 million (56.1%) survived on less than \$2, up from 2,549 million (61%) in 1987. The poorest of the poor live in East and South Asia and Sub-Saharan Africa, where 1090.5 million (93% of the total) of those living on less than \$1/day are found.
- (ii) A billion people lack access to improved water supply and 2.6 are without improved sanitation. Most (84% for water supply and 83% for sanitation) live in rural areas but the number of urban residents without adequate services is increasing rapidly. The majority (63% for water supply and 80% for sanitation) of those without adequate services live in Asia, but Sub-Saharan Africa has the highest proportion of people without water. Water-borne and water-washed diseases, linked to lack of access to adequate quantities of safe water and basic sanitation, are endemic in many regions. Millions are affected by malaria, filariasis, schistosomiasis, intestinal worms and other water-related diseases.
- (iii) Agriculture represents 70% (Tanzania over 90%) of all freshwater use and per capita food production has risen steadily over the last generation in all regions except Sub-Saharan Africa (where it continues to decline). But many millions are still malnourished.
- (iv) Around 800 million people don't have enough food to meet their basic energy needs and 2 billion lack a balanced diet.
- (v) Floods, droughts and major storms kill many people, cause billions of dollars of damage and affect the lives of many millions each year.
- (vi) The incidence of extreme events is increasing and will continue to increase due to climate change, while the most vulnerable are often the poorest people in the poorest countries. As the IPCC stated: "those with the least resources have the least capacity to adapt and are the most vulnerable".
- (vii) Around 1.7 billion people live in countries that are water-stressed. This number will rise to 5 billion unless major changes are made to global water management. Most are poor countries, and in these countries, scarcity is not evenly distributed.
- (viii) Water is also a component of a poverty reduction strategy but hitherto this has not been well articulated. Many aspects of water provision and management are relevant to poverty reduction.

2.2 Water Management and the MDGs

While one of the MDGs mentions water specifically, all of them are impacted by access to water in one way or another. For example, halving worldwide hunger heavily depends on better water management.

Improved water management can make a major contribution to poverty reduction. The goals and targets set out in the Millennium Declaration, the MDGs, provide a specific structure for analysing the relationship between poverty reduction and water management. Here all the MDGs are considered, not just those directly related to water, and that water management can play a key role as a part of strategies for achieving most the MDGs, either directly contributing or indirectly by creating conditions where the different goals and targets are more likely to be attained. The millennium Declaration calls for "sustainable water management strategies at the regional, national and local levels which promote both equitable access and adequate supplies".

2.2.1 Millennium Declaration Goals for 2015

- (i) Halve the proportion of people living in extreme poverty
- (ii) Halve the proportion of people suffering from hunger

- (iii) Halve the proportion of people without access to safe water and basic sanitation
- (iv) Enrol all children in primary school
- (v) Achieve universal completion of primary school
- (vi) Eliminate gender disparities in primary and secondary education
- (vii) Reduce maternal mortality ratios by three-quarters
- (viii) Reduce under-five mortality rates by two-thirds
- (ix) Halt and begin to reverse the spread of HIV/AIDS

In recent years there has been an increased focus on reducing poverty as a key responsibility of government and objective of donor support. At the UN Millennium General Assembly the Millennium Development Goal of halving the proportion of the world's population living in extreme poverty by 2015 was agreed by all member countries of the United Nations. Other goals and targets specific to water and poverty were agreed at the Millennium Assembly and at the World Summit on Sustainable Development.

2.2.2 Direct contribution of water resources management to poverty reduction

- (i) Reduced vulnerability to water-related hazards reduces risks in investments and production
- (i) Water as a factor of production in homestead gardening, agriculture, industry, and in many other types of economic activities
- (ii) Investment in water infrastructure and services as a catalyst for local and regional development
- (iii) Water as a direct input into irrigation for expanded grain production
- (iv) Reliable water for subsistence agriculture, home gardens, livestock, tree crops etc
- (v) Sustainable production of fish
- (vi) Better water management reduces mosquito habitats and malaria incidence. Improved health increases productive capacities, reduces burden on those who care for the sick
- (vii) Improved water management including pollution control and sustainable levels of abstraction key factors in maintaining ecosystem integrity. Reduced ecosystems degradation makes livelihood systems of the poor more secure

2.3 National Strategy for Growth and Reduction of Poverty (NSGRP) the famous MKUKUTA

Statistical coincidence

The Water Supply and Sanitation Collaborative Council (WSSCC) in 2000 reported a statistical coincidence involving poverty and water supply and sanitation services, that the numbers of those living on less than \$1 a day (1.2 billion worldwide) coincide approximately with the numbers of those without access to a safe drinking water supply (1.1 billion). The numbers of those living on less than \$2 a day (2.8 billion) coincide approximately with the numbers of those without access to safe sanitation (2.4 billion).

3.0 Poverty Reduction and Water Management (roles of IWRM in Poverty reduction)

IWRM aims to strike a balance between the use of resources for livelihoods and conservation of the resource to sustain its functions for future generations. The 'water-poor' could be defined as follows:

- (i) those whose natural livelihood base is persistently threatened by severe drought or flood;
- (ii) those whose livelihood depends on cultivation of food or gathering of natural products, and whose water source is not dependable or sufficient;

- (iii) those whose natural livelihood base is subject to erosion, degradation, or state confiscation (e.g. for construction of major infrastructure) without due compensation;
- (iv) those living at a long (defined) distance from a year-round supply of drinking water;
- (v) those obliged to expend a high (e.g. >5%) percentage of household income on water; slum dwellers obliged to pay for water at well above market rates;
- (vi) those whose water supply is contaminated bacteriologically or chemically, and who cannot afford to use, or have no access to, an alternative source;
- (vii) women and girls who spend hours a day collecting water, and whose security, education, productivity, and nutritional status is thereby put at risk;
- (viii) those living in areas with high levels of water-associated disease (bilharzias, guinea-worm, malaria, trachoma, cholera, typhoid, etc.) without means of protection;

Those most vulnerable would include the elderly; minorities (especially indigenous groups), those affected by HIV/AIDS or other kinds of catastrophic illness, or physical or mental impairment and those living in shanty-towns and surviving in the informal or invisible economy.

Apart from Water Supply and Sanitation, issues relating to the degradation of soils, forests, biodiversity, and water quantity and quality have been analysed in relation to environmental costs and protection measures, but the interactions between these phenomena and livelihood systems based primarily on the natural environment have been insufficiently noticed. Considerations based on an IWRM framework can allow equity considerations to be given a higher level of attention than has usually been the case.

The term 'water security' (GWP, 2000) has been used to describe the balance between the multi-purpose uses of water and the sustainability of resources at household, community, and levels above.



4.0 Opportunities to Reduce Poverty through water Management

The need for an integrated approach to water resources management has been recognised as obvious in international circles, and IWRM principles are increasingly being adopted within water-related policies and good governance. Gradually, countries are introducing reforms in law, policy and administration which reflect the new concern for sustainability, equity, and efficiency.

Civil society does not always wait for government to act. There are a number of settings where the reality of water scarcity and its disastrous impact on human survival, health and productivity has led to the emergence of local integrated water resource management solutions even if they were not consciously launched under an IWRM banner.

There exist quite a number of opportunities to reduce poverty in IWRM undertakings. Domestic Water supply schemes, Irrigated agriculture, water use for mining, hydropower schemes (of all sizes), industrial (small scale) are some of the pro-poor water related investments that can be used to reduce the impact of poverty on individuals and groups of people. There are other opportunities which do not seem to directly influence the livelihoods of the poor, but are actually important catalysts to poverty reduction. Here we are considering activities like environmental and water source protection, promotion and establishment of IWRM institutions (like Water user associations), and promoting recreational aspects of water resources.

5.0 IWRM based initiatives on Poverty Reduction in the Kikuletwa sub-catchment

Water user groups and irrigators associations such as for the Lekitatu, Kambi-ya-tanga, and Kamumama Irrigation Schemes have been formed to assist in the protection of water sources, management, allocation and resolving water conflicts in order promote equity, efficiency and effectiveness in the utilization of water resources. *(Participants will also be asked to identify the IWRM initiatives for Poverty Reduction in the Kikuletwa Sub-catchment)*

6.0 Policy Recommendations

The current **NSGRP** (MKUKUTA) documentation does not have direct statement on the role of IWRM in poverty reduction in the country. *(Participants will work in groups to discuss and recommend inclusion of some basic statement in this strategy.)*

7.0 Conclusions

Water management plays a key role in many aspects of the livelihood process and in the livelihood process and in particular essential to many livelihood activities. Water is basic to production, and production is clearly a factor in poverty reduction. The productivity of irrigated agriculture is particularly dependent on rational and wise water resources management. IWRM processes should contribute to a framework for investment in water infrastructure, such as irrigation and drainage canals and hydropower installations, which in turn are necessary for the community, basin and national development.

There are many opportunities in the Kikuletwa catchment and people living in the catchment can see their poverty being reduced considerably through proper IWRM implementation. Strategies should be developed be put in place measures that ensure strict adherence to IWRM principles as a way to reduce poverty.

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APPENDIX 1

River Basin Game Manual in Kiswahili

Februari 2004

Mwongozo wa Mchezo wa Bonde Mto

Zana ya Mazungunzo ya Maji

Maarifa na Utafiti
(KAR) R8064
Theme W5

Mradi wa RIPARWIN
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na Kuruhusu Maji kwa
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DFID

Idara ya
Maendeleo
ya Kimataifa



Mwongozo Wa Mchezo Wa Bonde Mto

Utangulizi

Huu mwongozo unaelekeza jinsi ya kupanga, kuweka bajeti, kuwasilisha na kusimamia **Mchezo wa Bonde Mto** (MBM), ambao ni zana ya kukuza mazungumzo baina ya pande husika juu ya matumizi ya raslimali ya maji. Huu **Mchezo wa Bonde Mto** ni uwakilishi bayana wa Bonde Maji dogo (au **Bonde Mto** dogo) lenye mwinamo kuonyesha mtiririko wa maji kutoka kwenye mkondo wa juu kuelekea mkondo wa chini. Wachepushaji/watumiaji wa maji wa mkondo wa juu hupata upendeleo dhidi ya wachepushaji na watumiaji maji wa mkondo wa chini. Tofauti hii mara kwa mara husababisha kutokuwa na usawa wa upatikanaji wa maji kwa watu vijijini – ambayo huzua migogoro. Kwa nyongeza huu **mchezo** hutumika kupitia igizo la hali halisi kufanya utafiti na kurahisisha mchakato wa kufanya maamuzi ya mahali maalumu.

Kama inavyoonekana katika picha 1-4, huu **mchezo** ni bao kubwa lililoanamishwa likiwa na eneo la kuteka maji katika mwisho wa kilele juu na 'ardhioevu' katika ukanda wa chini (Pia tazama kiambatisho E). Huu **mto** hutiririka kati ya maeneo haya mawili, na mto huo una mabanio kadhaa ya mifumo ya umwagiliaji ya ukubwa mbalimbali. Baadhi ya mifumo hiyo ya umwagiliaji hunufaika kwa kuwa ipo kwenye mkondo wa juu wa **mto**, wakati mifumo mingine ipo mwisho mkiani. Inadhaniwa kuwa mitiririko ya maji huanzia kutoka mkondo wa juu kabisa ya bonde maji na kwa kweli bila kuwa na, au kuwa mitiririko michache sana toka sehemu nyingine za bonde maji. Huo **mto** 'hutiririka' wakati kiasi kikubwa cha gololi zitakapoachiwa kuelekea chini **mtoni**. Hizi gololi huwakilisha maji. Wahusika huweka vijiti vidogo (mfano wa mabanio) kuinga **mto** ili kuteka hizi gololi na kuzichota kuelekea kwenye mifumo ya umwagiliaji ambapo zitatumbukia katika vishimo vidogo – hivyo kukidhi mahitaji ya maji ya hilo shamba mahsusi la mpunga au umwagiliaji. Hizi picha (1 na 2) huonyesha vijiti vikubwa vinanyokinga gololi kwa urahisi sana – hivi zinawakilisha mabanio ya kisasa yaliyoboreshwa. Ifikapo mwisho wa **mchezo**, washiriki huwa na ufahamu mzuri wa kile kinachotokea, kinachotakiwa kulengwa na ufumbuzi gani unaopaswa kufikiriwa. Ni lazima ilezwe kwamba huu **mchezo** wapaswa kulisimka kwa hali ya juu.

Siku ya pili huanza kwa ufuatiliaji wa masomo yaliyofunzwa kutoka kwenye **mchezo** wa siku iliyotangulia, na kuleta pamoja asasi mbalimbali kusaidia kuboresha usawa wa ugavi wa maji. Siku zote mbili zinahitaji mpango mzuri ili ziwe za mafanikio.

Mchezo wa igizo la hali halisi na uhusishwaji wa umma katika kufanya maamuzi.

Inatambulika kwa mapana kuwa kufanya maamuzi ya umma, kutaka ushauri na kushiriki katika usimamizi wa bonde maji kuonekana kuwa tendo jema (WWW, 2001, Chave, 2001). Matendo haya ya ushirikishaji husaidia kuelezea matatizo, kuweka kipaumbele, kuchagua teknolojia na sera, na kusimamia na kutathmini athari na kwa kufanya hivyo kunategemewa kustawisha ufanisi (Johnson na wengine, 2001 ukurasa wa 507). Thamani ya hii michakato taamali (ambayo hulenga kupata mdahalo wa umma) juu ya miundo mingine ya kufanya maamuzi inaongelewa kwa uwazi na Collentine na wengine, (2001) ambao wameona manufaa ya ndani katika kuongeza uhalali na demokrasia taamali na mdahalo hususani juu ya mbinu ambazo zinategemea aina ya ushirikishaji wa kukubalika/kukataliwa.

Igizo la hali halisi ni zana inayofahamika sana katika tathmini shirikishi vijijini (PRA), uwezeshaji jamii na urahisishaji wa usimamizi wa mali asili (Forester, 1999). Miaka mitano iliyopita, kazi na manufaa ya mchezo wa igizo la hali halisi katika usimamizi wa mali ya asili kijamii umeongeza kuvutia utafiti. Kitengo cha Cormas (2003) cha Cirad Ufaransa kwa mfano kinaendesha utafiti wa kina juu ya matumizi ya mifano yenye msingi wa kiwakala katika mali asili. Becu na wengine (2003) huelezea 'CatchScape' ambalo ni igizo lenye msingi wa programu ya kompyuta la kutathmini migogoro juu ya maji katika kiwango cha bonde maji huko Thailand ya Kaskazini ikiwa na msingi wa mapendekezo kwa matumizi ya ardhi na usimamizi wa maji. Farolfi na wengine (2003) wameanzisha AWARE (Tathmini ya Raslimali na Uchumi endelevu wenye Msingi wa Kiwakala katika Bonde Maji), mfano wa mfumo wa mawakala wengi wa kutafiti ufanisi wa kiuchumi, mazingira endelevu na kukubalika kijamii kwa baadhi ya mikakati tarajiwa ya usimamizi maji ambayo Kamati za Mabonde Maji Kusini mwa Afrika zingeweza kuitumia

Watafiti wengine pia wanatathmini mchezo wenye msingi wa mawakala wengi, ingawa mingi ni ya kompyuta. Feuillette na wengine (2003) wameelezea mfano wenye msingi wa kompyuta wa mawakala wengi kujadili usimamizi wa mahitaji ya maji juu ya raslimali changia ya maji ambapo watumiaji huweka vigezo na maamuzi yenye mtazamo wa mienendo mbalimbali ya matakwa na misukumo.

Tafakari/Mapitio ya maandiko mbalimbali huonyesha tofauti pana ya faida na viwango vinavyohusiana na michezo kama zinavyoorodheshwa hapa:

- ⇒ Michezo ni nyenzo ya kusaidia maamuzi pale wachezaji wanapokuwa wafanya maamuzi wanaotegemeana (Ubbels na Verhallen, 2000).
- ⇒ Kucheza kunaruhusu maingizo wakati wa kipindi badala ya mwanzoni tu na kwamba wajibu wa wafanya maamuzi wa aina mbalimbali unatolewa (Ubbels na Verhallen, 2000)
- ⇒ Utoaji maamuzi hutokea kwenye mazingira yasiyotisha ili kurahisisha mawasiliano (Ubbels na Verhallen, 2000) au kuendeleza elimu yenye kufurahisha kuhusu mambo yenye utata (Burton, 1989).
- ⇒ Michezo yawezakutumika kwa mafunzo ya mafundi/wataalamu na wasio mafundi/wataalamu wanaohusika na uendeshaji wa miradi ya umwagiliaji (Burton, 1989).
- ⇒ Michezo huwaonyesha wafanya maamuzi wa kiwango cha juu jinsi maamuzi yao yanavyoathiri watumiaji wenyeji wa raslimali (Burton, 1989).
- ⇒ Michezo hufunua faida kwamba mawasiliano shirikishi yana maana na yanaweza kupatanisha tofauti katika maelewano (Burton 1989) na kutumika kama zana ya kusaidia majadiliano, kufungua mkondo mpya wa mahusiano (Barreteau na wengine, 2001)
- ⇒ Kucheza igizo la hali halisi kunatoa uwezo wa kujaribu kile kinachotokea katika ulimwengu halisi bila ya kuhitaji kutumia au kuhatarisha huo mfumo unaojaribiwa (Burton, 1989).
- ⇒ Vyombo hivi huwakilisha na kuigiza hali halisi ya kuwepo au kutokuwepo kwa kanuni za pamoja za usimamizi wa maliasili (Barreteau na wengine, 2001).
- ⇒ Zana hizi za kusaidia majadiliano huruhusu uchunguzi kamili, na wa sehemu ya matatizo yanayotokea na kujulikana kwa kila mdau (Barreteau na wengine 2001).
- ⇒ Michezo yaweza kuzuia taswira isiyoridhisha au tabia ya imani mbaya. (Katika kuelezea mfano mmoja wa taswira isiyoridhisha, tunapendekeza kwamba mchezo uepuke upendeleo wa uana-teknokrasia ambao unaweza kuwepo baina ya wahandisi na watumiaji wenyeji wakati wa kujadiliana maji kwa sababu watumiaji wenyeji wanapata ujasiri kuhakikisha kuwa maoni yao yanasikilizwa (Taz. Pia D'Aquino na wengine, 2003).
- ⇒ Uzoefu wa watunzi wa **mchezo wa bonde mto** ni kwamba utata unaweza kufanyiwa kazi kupitia **mchezo** rahisi kiasi uliobuniwa na kusambazwa bila kupoteza uaminifu au ukweli wa mchezaji

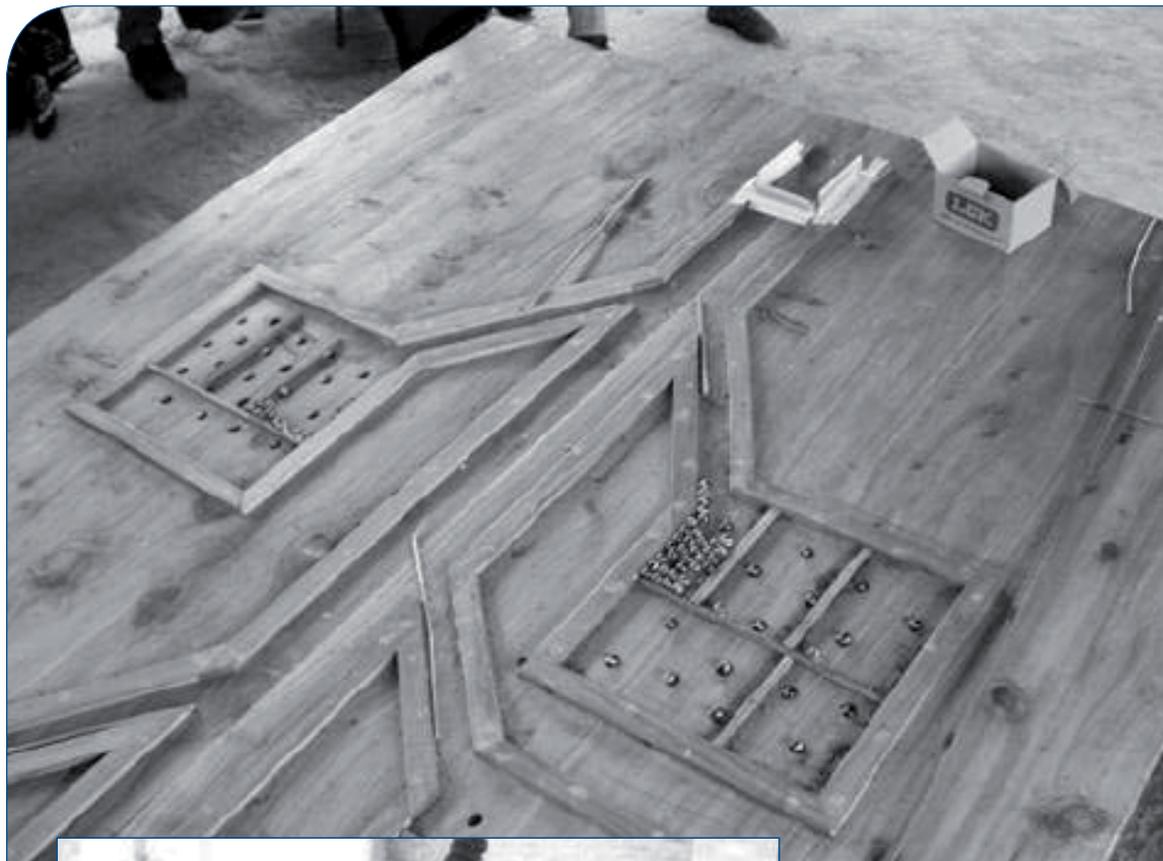
- kwenye **mchezo**. Hii inamridhia Barrateau (2003) ambaye huamini kwamba michezo na mfano wa igizo la hali halisi husaidia kuweka mazingira ya mpaka na kupunguza mambo yenye utata kwa muda na nafasi, akipendekeza uwezekano wa kupata mambo ya muda mrefu.
- ⇒ Vigezo vya mafunzo ya igizo la hali halisi kupitia michezo huhusisha maboresho ya uwezo wa kutambua wa wadau (Telier-Bourguine, 1997). Michezo pia husaidia mafunzo ya maono na thamani inayohusiana na ugawaji wa maji (Hagmann na Chuma, 2002).
 - ⇒ Michezo husaidia washiriki kuelewa michakato ya msingi ya kiasili na kijamii (Hagmann na Chuma, 2002). Kwa mfano tulitumia huu **mchezo wa bonde mto** kuelezea mchoro wa tija ya maji katika Pareto
 - ⇒ Kucheza huimarisha huu mchakato wa majaribio kupitia kuwekwa wazi kwa mapendekezo (Hagmann na Chuma, 2002). Katika hali hiyo hiyo, husaidia kufunua usimamizi mbadala na wenye uwezekano wa mandhari ya ushindi kwa pande zote (Ubbels na Verhallen, 2000).
 - ⇒ Kucheza huwafunza watumiaji kuhusu mazingira yasiyo ya kawaida (Ubbels na Verhallen, 2000). Watunzi wanahisi huu kama mwanzo wa uendelezaji wa utaratibu wa dharura, lakini hili kusudi ni la muhimu kwa **mchezo wa bonde mto** mahali ambapo maamuzi wakati wa ukame unaoendelea ni tofauti na yale yaliyotolewa wakati wa hali ya hewa ya kawaida.
 - ⇒ Michezo huruhusu washiriki kupata umaizi/utambuzi wa huo mchakato wa kufanya maamuzi. Wachezaji na watazamaji huona taarifa gani inahitajika kufanya maaamuzi, jinsi maamuzi yanavyofanywa kwa hali halisi na nafasi gani ya kithamani waliyonayo wadau mbalimbali (Ubbel na Verhallen, 2000)
 - ⇒ Zaidi ya hayo, igizo la hali halisi pia linaonekana kama zana halali ya utafiti wa kijamii wenye kutegemea sifa (Bloor, 2001; Mikkelsen, 1995; Nichols, 1991; Pratt na Loizos, 1992).

Pamoja na hoja ya mwisho, inastahili kuzungumzia kwa kifupi faida na hasara ambazo michezo kwenye utafiti. Barreateau na wengine (2003 kipengele 1.1) kuamini michezo wa maigizo ya hali halisi kuwa “njia ya kufunua baadhi ya vipengele vya mahusiano ya kijamii kwa kuruhusu utazamaji wa moja kwa moja wa maingiliano baina ya wachezaji”, na kuendelea kutahadharisha kuwa huhitaji kusimamiwa kwa uangalifu, kuwa na utaratibu kwa ujumla na iliyofupishwa ndani ya mankiti rasmi, marejesho na shughuli za ufuatiliaji. Cardenas (2003), kwa mfano, alitumia zoezi la pamoja la kufanya maamuzi kuchunguza ile fikra kuwa mchanganyiko wa washiriki hatimaye hudhoofisha uwezo wao kutekeleza ahadi zilizofikiwa kupitia makubaliano ya pamoja.

Ikiwa ni zana ya kweli ya utafiti, kama kuna mwenye tumaini la kufananisha matokeo katika njia yenye utaratibu, **mchezo** wa igizo la hali halisi linaathirika kutokana na ugumu unayohusiana na kuchukua sampuli za kitakwimu, uchanganuzi wa ukubwa, upendeleo na utoaji wa matokeo. Barrateau *na wengine.*, (2003) kwa dhati wanabainisha kuwa vipengele vingi sana vimebaki bila uthibiti na kwamba marudio ya huu **mchezo** kwa wachezaji walewale una matatizo kwa vile umaizi/ utambuzi unaopatikana kutoka kwenye kipindi cha kwanza hauwezi kufutwa. Hii hubadilisha muktadha na mazingira ya kipindi cha **mchezo** na maarifa ya awali ambayo wahudumu huanza nayo.

Kazi kidogo iliyofanyika juu ya kubuni michezo kwa watumiaji, ambayo D’Aquino na wengine (2003,) huamini kuchukuwa uwezeshaji zaidi: (Kwa kweli, kuhusisha watu na kanuni katika mchakato wa kufanya maamuzi ya usimamizi ya matumizi ya ardhi na mipango, teknolojia ya habari haipaswi tu kusaidia upatikanaji wa habari lakini pia kusaidia watu kushiriki kikamilifu katika ubunifu wake, mchakato na matumizi” Huu **mchezo wa bonde mto** hauendi mbali hivi; awali ulibuniwa, ingawa kwa mategemeo ya wepesi kuhisi mazingira yanayoonekana mahali Fulani.

Kwa kutambua viwango halisi na tahadhari za igizo la hali halisi na kuchezo ikiwa ni sehemu ya kuongeza upeo mkubwa kutoa maamuzi huru tunaamini **mchezo** huu wa ubao unafaida katika michakato na madhumini hayo.



Picha 1. Muonekano wa sehemu ya juu ya mchezo wa bonde mto, ukionyesha mfereji mkuu, vituo vya kuchepusha maji, muundo wa mabanio, mashamba na mbuga, gololi zitumikazo kuonyesha maji na vishimo vidogo vinavyoonyesha uhitaji wa maji ya umwagiliaji.

Picha 2. Siku ya kwanza. Washiriki wakicheza mchezo wa bonde mto kwa kuchagua mikakati ya kuchepusha maji



Picha 3. Siku ya kwanza. Washiriki wakifikiri ugawaji maji usio sawa unaojitokeza sasa



Picha 4. Siku ya pili. Washiriki wakijadiliana maazimio mapya ya kusimamia na kugawana maji.

Ni mazingira gani mazuri kwa mchezo huu kucheza?

Watunzi wanahisi kuwa mchezo huu unafaa kwenye mabonde maji madogo madogo (50 -500 km za eneo) mahali ambapo maji yanatumiwa na watu mbalimbali waliojipanga kutoka kwenye mkondo wa juu hadi wa chini katika mpangilio wa kupata maji yaliyopo. Toleo la mchezo wa matumizi ya maji ya visima vya chini bado halijatengenezwa. Watumiaji wa maji hujumuisha mifumo midogo na mikubwa ya umwagiliaji, majumbani, mazingira (aridhioevu, samaki na mifugo), viwandani na utata mkubwa. Katika hali hiyo, bonde maji huhitaji kugawanywa.

Nani achezaye huu Mchezo?

Kuna njia nne za kucheza Mchezo huu:

1. Wanafunzi pamoja na Watafiti wa masuala ya usimamizi wa maji kujifunza kuhusu usimamizi wa raslimali changia ya maji
2. Pamoja na watumiaji wenyeji wa raslimali ya maji kurahisisha wafanya maamuzi wenyeji kuhusiana na mgawo wa maji. Hii huhitaji mwezesaji mwenye uelewa wa masuala ya maji
3. Aina hii ya mchezo pia huruhusu watafiti kujionea kile ambacho mchezo unadhihirisha kwa maana ya hali halisi ya matatizo na mapendekezo ya utatuzi
4. Pamoja na watoa maamuzi wa ngazi ya juu kwa kuhamashisha kukubalika kwa masuala yanayowajiri watumiaji wenyeji wa maji na matokeo ya faida au hasara kutokana na maamuzi rasmi yafanywayo juu ya usimamizi na upatikanaji wa maji
5. Kwa pamoja asasi za ngazi ya juu na watumiaji wenyeji wa maji kuleta taswira pana ya ushirikiano, hali yakuweza kubadilika kwa urahisi kupokea mazingira mapya na msaada vinahitajika kusimamia maji kwenye ngazi ya bonde maji dogo.

Maamuzi kuhusu nani aalikwe unapaswa kufanywa kwa uangalifu, na ushauri katika huu mwongozo uliorekebisha kufuatana na malengo yake. Kwa nyongeza, waalikwa wanaweza kugawanywa katika makundi ya wachezaji na waangaliaji.

Kiambatisho A kinashauri baadhi ya “kanuni muhimu” za kucheza Mchezo huu.

Utangulizi wa Mchezo

Huu Mchezo ulibuniwa na Bruce Lankford mnamo mwaka 2000 kwenye Chuo Kikuu cha Anglia Mashariki, Uingereza kuwafundisha wanafunzi wa shahada ya kwanza kanuni za usimamizi wa raslimali changia kama yalivyo maji. Mchezo huonyesha kwamba baadhi ya mikakati ya mahitaji ya maji huleta matokeo ya kunufaisha watu fulani katika jamii ili hali wengine wakiachwa/wakitengwa.

Mnamo miaka ya 2002 na 2003, mchezo huu ulijaribiwa na wakulima na wadau chini ya mradi wa Kuongeza Tija ya maji ya Umwagiliaji na Kuruhusu maji kwa Mahitaji Miongoni mwa Sekta (RIPARWIN). RIPARWIN inafadhiliwa na Idara ya Maendeleo ya Kimataifa (DFID) chini ya Mpango wa Maarifa na Utafiti (KAR) na husimamiwa kwa ushirikiano kati ya Programu ya Utafiti wa Usimamizi wa Maji Ardhini (SWMRG) ya Chuo Kikuu cha Sokoine cha Kilimo, Kikundi cha Maendeleo ya Ng'ambo (ODG) ya Chuo Kikuu cha Anglia Mashariki na Taasisi ya Kimataifa ya Usimamizi wa Maji (IWMI) chini ya Ofisi yake ya Kanda ya Afrika iliyopo Afrika Kusini. Katika majaribio haya, huu mchezo ulifanikisha kuibua mazungumazo kuhusu maji katika ukanda wa juu za Bonde la Mto Ruaha Mkuu, ujulikanao kama Uwanda wa Usangu.

Hivi karibuni, mnamo mwaka 2003 Kongamano la Maji na Migogoro la Montpellier, mchezo huu uliwasilishwa kama chapisho la kitaaluma/kisayansi (scientific paper). Hili lilileta shauku zaidi na baadhi ya washiriki wa Kongamano wakihi kuwa mchezo huu unahusisha mazingira yao, ukichukulia kwa mfano, Bonde la Mto Mountain, nchini Peru lenye mlolongo wa mabanio ya umwagiliaji.

(Tazama Lankford, B. A na Sokile C. 2003. Fikira za Mchezo wa Bonde Mto: Rahisisho la igizo la hali halisi la mgawanyo wa maji ya juu katika mazingira ya ushindani. Chapisho liliwasilishwa kwenye Kongamano la 20 la ICID, Kanda ya Ulaya, liliofanyika Montpellier, Ufaransa, 17-19, Septemba 2003).

Mwonekano wa Ratiba

Kila mchezo huchezwa kwa siku mbili. Muundo wa tolea la Usanga ni mahsusi kwa aina ya matatizo yaonekanayo huko.

Siku ya kwanza. Mchezo wa bonde mto na video “Ongelea kuhusu Usangu” (Makala ya aina ya “Maongezi yawalengayo wadau”). Mchezo huisha baadaye alasiri. (Pendekezo, jioni ya siku ya kwanza: Tafrija).

Siku ya Pili. Ufuatiliaji wa kina ukijiuliza “Jinsi gani twaweza kutumia video na mchezo wa bonde mto na njia gani za kuokoa na kugawanya maji? Njia zipi zilizopo kuwawezesha watumiaji weneyeyi wa maji? Asasi za ngazi za juu zina jukumu gani? Ni asasi gani mpya na mkubaliano gani yanayohitajika? Hao washiriki (watumiaji au asasi za ngazi za juu) wanamaliza katika muda wa saa moja mpaka mawili baada ya chakula cha mchana – lakini waweza kuendelea zaidi ya muda kuo kama ni muhimu.

Baadaye alasiri, kipindi cha marejeo kati ya wachezaji na watazamaji na wasimamizi wa mchezo kinapaswa kuwepo ili kujadili matokeo ya siku mbili na kutayarisha masomo na mahitimisho.

Maswali

Katika kupanga ni muhimu kufikiria baadhi ya maswali ya msingi:

1. Ni kitu gani tunachotaribu kufanikisha?
2. Jaribio la igizo la hali halisi laweza kunufaisha ufahamu wa ugavi wa maji usiosawa juu mwanzoni mwa bonde mto na kwamba utatuzi upo kwa jamii, hususani kama msaada wa asasi rasmi utatoa majibu ya mahitaji yao.
3. Kuna wachezaji na watazamaji wangapi? Kama kuchagua watumiaji wa maji – labda 10 kutoka mkondo wa juu za bonde mto, 10 kutoka kati na 10 kutoka chini lakini hakuna watu walio wakulima wakutegemea mvua tu, lazima wote wawe watumiaji wa maji ikiwa ni kwa ajili ya matumizi ya nyumbani, mifugo au ya umwagiliaji. Wakulima wanaotegemea mvua hawawezi kufungulia maji!
4. Ni nani wa kuwaalika kama wachezaji na watazamaji? (kwa mfano Afisa wa Bonde Mto la Ruaha (RBWO), RBMSIIP, Afisa wa Bonde Mto la Pangani, wawakilishi wa SRMP, Taasisi ya Utafiti wa Kilimo wa Nyanda za Juu Kusini (SHARI), Afisa wa Umwagiliaji wa Wilaya ya Mbarali).
5. Maandalizi gani yatakiwayo? Ni msaada gani unahitajika? Ufuatiliaji gani unatakiwa?

Mwongozo huu husaidia kujibu baadhi ya maswali haya. Kiambatisho A (Kanuni muhimu) kinapaswa kurejewa.

Bajeti

Hii bajeti huchukulia warsha ya siku mbili na washiriki takribani 50. Ili kufanikisha hili unahitaji siku nzima, kunahitaji kuwasili kwa washiriki, viburudisho, mlo wa mchana jioni na tafrija.

Gharama za vipengele hivi ni kama ifuatavyo:

1. Milo miwili ya mchana kwa wachezaji 30 na watazamaji 20, jumla watu 50.
2. Mlo wa jioni mwishoni mwa siku ya kwanza kwa watu 50.
3. Staftahi kwa idadi ile ile ya watu kwenye siku ya Pili.
4. Kwa kifupi chakula = milo 4
5. Ada ya makazi italipwa kwa wenyeji
6. Posho ya kujikimu na ya siku kwa wakulima na washirika waalikwa wengineo
7. Posho ya siku kwa watazamaji waalikwa
8. Usafiri kuwakusanya na kuwarudisha wakulima na waalikwa
9. Gharama za vifaa vya kuandikia na vingine vya aina mbalimbali

Tarehe na maandalizi

- Panga tarehe kuruhusu mchezo ufanyike katikati ya juma. Ruhusu miezi 2-4 ya kutuma mialiko na kufuatilia kwa baruapepe/barua
- Kwa mialiko kutumwa (Tazama mfano wa barua ya mwaliko Kiambatisho B)
- Pendekeza kuruhusu ziada ya 50% ya mialiko kwa sababu siyo waalikwa wote watakaohudhuria
- Wakulima na vikundi ya watumiaji maji watambuliwe kutoka kwenye eneo lengwa
- Wataarifu wenyeji – panga malazi na mahali pa kukutania
- Nani waliowatazamaji wazuri kualikwa? Ofisi ya Bonde Mto, Wizara ya Maji na Maendeleo ya Mifugo, Wizara ya Kilimo na Chakula, Afisa Umwagiliaji wa Wilaya, Afisa Umwagiliaji wa Kanda na wengineo?
- Weka mipango, kama ni muhimu, kuchukua picha za video – huu mchezo wapaswa kuwa njia mojawapo ya kuibua mahitaji kutoka kwa wanajamii wenyeji kwa Mamlaka ya Bonde Mto kutoa utatuzi wa migogoro na kuhandisi mabanio upya.
- Utahitaji tathmini ya siku. Kwa mfano, itakuwa wazo zuri kupata Watafiti wawili kuandika na kuchukua kumbukumbu ya hoja za msingi zinazotolewa na wakulima lakini hazitamkwi katika majadiliano
- Tengeneza fomu ya tathmini (Tazama Kiambatisho C kwa mfano)
- Mchezo wa Bonde Mto – Siku ya kwanza
- Hapo chini kuna muundo wa msingi, lakini hili liko wazi kwa mapendekezo na tathmini. (Muda uliopangwa ni wa mfano tu sababu kipindi kizima kinachukua takribani saa 3-4 na wapaswa kuendelea kutokana na majadiliano na majibu). Kuna awamu tano za mchezo kwa siku ya kwanza baada ya utangulizi.
- Awamu ya kwanza: Utangulizi na maonyesho ya Mchezo
- Awamu ya pili: Harakati binafsi za kupata maji
- Awamu ya tatu: Harakati binafsi kupata fedha (vyanzo vya mapato)
- Awamu ya nne: Harakati za jamii kugawa maji kwa usawa na kipaumbele
- Awamu ya tano: Majadiliano ya awali, masomo, marejesho, harakati za baadaye, msaada na muhtasari (Majadiliano makuu huachwa mpaka siku ya pili)

Jedwali 1 hutoa awamu za msingi na nini kila moja inajaribu kuonyesha

Utangulizi wa hizi siku mbili

Kipindi kinachotangulia mchezo ni cha kuwakaribisha kila mmoja na kuwaruhusu waliofika hivi punde kujiweka sawa. Utambulisho wa washiriki kwa zamu za mzunguko unafanyika hapa. Mwezeshaji anaweza pia kutoa kwa kifupi baadhi ya kanuni kuu – kwamba kila mmoja anapaswa kushiriki. Wakulima hujisikia vyema wanapohushishwa katika matatizo ya maji Ki-ulimwengu/Ki-mataifa hasa kufuatilia mgao maji kwa sekta mbalimbali, uzalishaji wa mazao na utatuaji wa migogoro, ongezeko la mahitaji ya maji kwa sekta nyingi na kutofautsha kati ya mahitaji na matakwa ili kwamba tuweze kujiuliza ‘Jindi gani twaweza kukidhi mahitaji ya walio maskini zaidi kwenye bonde maji dogo?’ Huu utangulisha unawakumbusha washiriki kwamba kwa maskini aliyeko mkiani kiasi kidogo tu cha maji kina thamani kubwa kwa maisha yao, ili hali kwa tajiri wa maji aliyeko mwanzoni (kichwani) mwa bonde maji kuachilia hicho kiasi cha maji labda hakutajuwa na tofauti yeyote au hata kutambulika. Tunarejea kwa miradi ya Wafadhili, Wilaya na Mashirika yasiyo ya kiserikali (NGOs) ambayo imeshughulikia maji katika maeneo na kutambulisha ramani ya Bonde Mto lote kuonyesha mahali lili Bonde Maji dogo la Mkoji, tukiwauliza washiriki kuonyesha na kutaja watumiaji kama vile; majumbani, mifugo, mpunga, zao lisilo mpunga, ardhievu, uvuvi, wanyama pori, Hifadhi za Mbuga za Taifa Ruaha, watalii, na mabwawa ya uzalishaji wa umeme ya Mtera/Kidatu. Ingawa ramani rasmi ilitolewa mwanzoni, mwezeshaji ahimiza uchoraji wa ramani kwa mikono ili kwote wairejee. Japokuwa bao la mchezo haliwakilisha hali sahihi, kuna miundo mbinu mingi (mifereji, mabanio, mitaro ya kutolea maji) ambayo imeongezwa kwenye ramani.



Jedwali 1. Maonyesho ya uhalisi wa mgao wa maji kwa kucheza Mchezo wa Bonde Mto

Nini kionyeshwacho?	Kwa vipi?	Nini hutokea?
Awamu ya kwanza. Mazingira ya utangulizi rahisi		
Hakuna mabanio	Hakuna vijiti ndani ya mto	Maji hutiririka kuelekea ukanda wa chini
Mabanio machache	Kijiti kimoja au viwili vinawekwa (yaweza kuwa mazingira ya umwagiliaji asilia au wa kisasa)	(Maji machache huchepushwa kuelekezwa kwenye mifumo wa kilimo cha mpunga, ili hali maji mengi hutiririka mpaka kwenye ardhievu)
Mabanio mengi	Vijiti vyote huwekwa ndani ya mto	Maji yote hukingwa kuelekezwa mashambani, maji machache (gololoi chache) huelekea mkondo wa chini kwenye ardhievu
Mwaka mkavu (usio na mvua za kutosha) au wakati wa kiangazi	Gololi chahe hutumiwa	Maji hutumiwa na watu wa pande za juu za mto, ili hali kiasi kidogo cha maji hutiririka kuelekea ukanda wa chini ya mto
Mwakaoveu (wenye mvua za kutosha) au Masika/Vuli	Gololi nying hutumiwa	Maji hukidhi mahitaji ya kila mmoja
Mabadiliko ya mabanio ya kiasili kuwa ya kisasa	Mabadiliko ya usanifu kutoka vijiti vidogo ambavyo huzuia mto kwa kiasi kuwa vijiti vikubwa vinavyozuia mto wote	Maji mengi hutekwa na mabanio ya kisasa –Maji machache hutiririka kuelekea chini na hali ya kukosa usawa huongezeka
Awamu ya pili. Mikakati ya mtu binafsi na banio moja moja – utafutaji wa maji.		
Mgao wa maji kati ya ukanda za juu na ukanda wa chini	matumizi ya mabanio ya kisasa	maji zaidi katika mbanio ya juu
Matumizi ya ziada	Gololi mingi sana shamba	Kila shamba lina gololi zaidi ya vishimo kuonyesha kwamba wakulima wa ukanda wa juu kutumia maji zaidi ya mahitaji
Awamu ya tatu. Mikakati ya mtu binafsi na banio moja moja – utafutaji wa fedha – vyanzo vya mapato		
Utafutaji wa vyanzo vya mapato	Wakulima kuhamia kanda za juu	Wakulima hukodi aridhi kanda za juu au kutafuta vibarua pale maji yalipo au kwenda kufanya kazi nyingine
Maji haba	Gololi chache sana kwa shamba au hakuna gololi kwenye shamba	Wakulima huachwa bila maji, huhama, hutembea umbali mrefu kutafuta maji ya majumbani, huanza biashara, hukodisha ardhi, huuza nguvu kazi yao n.k.
Mahali pa mabadilisho	Wakulima mkiani-mwishoni mwa bonde (chini) na wa mwanzoni mwa bonde (juu) wanabadilisha nafasi	Hamasisha watu kuona maoni ya wengine kuhusu upatikanaji wa maji
Awamu ya nne. Mikakati ya jamii na kushirikiana ya maji kwenye mto wote.		
Makubalino ya kushirikiana maji baina ya mabanio	Rekebisha mabanio kuruhusu maji kutiririka kwenye mabanio ya ukanda wa chini	Maji hugawanywa baina ya mabanio tofauti na kila shamba hupata maji kidogo
Makubaliano ya kushirikiana maji kati ya mashamba	Gawio la gololi lifanyike ili kila shamba lipate idadi sahihi	Gololi moja kwa shimo – na usawa kati ya mashamba ili kwamba kila shamba liwe na pungufu ya gololi moja

AWAMU 1. Utangulizi wa Mchezo wa Bonde Mto. Hatua hii inadumu kwa takribani saa moja. Muda huu ni makadirio, muda wa ziada wapaswa kuruhusiwa ili kuwa na uelewa mzuri

Awamu hii ni kuonyesha jinsi gani mchezo hufanya kazi. Kanuni za msingi na makubaliano (kusikiliza, kuuliza maswali) ya mchezo yanaelezwa. Washiriki walitaarifiwa nini wanachopaswa kuona, kwamba wangepaswa kufanya mzunguko na kwamba Mwezesaji anangepaswa kuelezea nini walichokiona.

Ingawa ilikuwa muhimu kuruhusu huu mchezo kuwa na mwenendo halisi, ilikuwa muhimu kuufanya mchezo kufanikisha matokeo fulani. Mjadala uliruhusiwa baina ya watumiaji wa maji kabla ya kila mzunguko hivyo waliingia kwenye mchezo – katika hatua ambayo mwezesaji hapaswi kumiliki matukio.

- Dakika 15 za mwanzo, **kipindi cha makaribisho**. Dhumuni la siku. Dhumuni la mchezo. Kanuni na makubaliano ya kuwa sehemu ya timu (mfano kusikiliza, kuuliza maswali n.k.).
- Dakika ya 15 – 25, maelezo na maonyesho ya mtiririko wa gololi kelekea kanda za chini za mto katika mazingira manne ya msingi; bila ya kuwa na mabanio, kuwa na mabanio mengi, kuwa maji mengi (mwakaoevu/ mwka wenye mvua nyingi) na kuwa na maji machache (Mwaka mkavu). Kila onyesho la mtiririko mmoja huitwa ‘mzunguko’ mmoja.
- Dakika ya 25-30. Gawa washirika katika makundi na mchezo wa awali ufanyike kutumia vijiti ambavyo vinawakilisha mabanio ya kiasili (haya ni yale yaruhusyo maji kupita).
- Dakika ya 30-35 – Mchezo wa pili kutumia mabadiliko ya mabanio ya ukanda wa juu kuwa ya kisasa, hivi ni jijiti vikiubwa ambavyo kuteka maji yote au gololi zilizo nyingi.
- Dakika ya 35-45, Mjadala. Nani mwenye furaha? Nani aliyepata maji? Nani mwenye uhaba wa maji? Kwanini? Nani apataye maji zaidi, labda zaidi ya mahitaji yao?
- Dakika ya 45-55. Marudio. Muhutajari wa kilichotokea. Uwiano wa ardhi kwa maji – ukweli ni kwamba hakuna ardhi zaidi ya maji. Tofauti katika mvua na mtiririko wa mto (miakaoevu na mikame, masika/vuli na kiangazi). Shauku ya mpunga na maji. Kukua kwa umwgiliaji zaidi ya miaka 20 iliyopita. Ugumu wa ugavi katika ardhioev ya lhefu.

AWAMU 2. Harakati binafsi – Utafutaji maji

Awamu hii huonyesha kwamba watu watafutaji maji kibinafsi waweza kupata maji kuzidi mahitaji yao hivyo kupelekea ufanisi duni wa matumizi ya maji na watumaji ya ukanda wa chini kukosa maji.

- Dakika 10 za mwanzo, Utangulizi wa hatua hii ya mchezo. Elezea madhumuni: Kwamba kila mtu huhitaji kutafuta suluhisho la tatizo lao la upungufu wa maji. Hii yamaanisha kuwa harakati za kijamii ni ndogo sana au hakuna kabisa. Nini chahitajika kutokea? Watu hufanya nini?
- Dakika ya 10 -15. Wakulima hufikiri kuhusu chaguo lao kabla ya kufungulia mtiririko wa gololi za msimu mpya. Wanajiuliza maswali – Jinsi gani naweza kupata maji?
- Dakika ya 20-35. Mizunguko kadhaa huchezwa ili wakulima wanaweza kujipanga kimanufaa zaidi kupata maji na kufikiri kuhusu masuluhisho ambayo hukidhi mahitaji yao binafsi.

AWAMU 3. Harakati binafsi na mazingira ya kuchukuliana na upungufu wa maji – utafutaji wa mapato/vyanzo vya mapato.

Awamu hii huonyesha watu wachukua hatua kibinafsi kutafuta vyanzo vya mapato yenye msingi wa maji kwa kuendeleza mikakati ya kuchukuliana

- Dakika 10 za mwanzo. Kwa uchaguzi, katika sehemu ya pili ya hatua hii, mfano wa noti za fedha zinaweza kutumika ili washiriki waweze kukodi au kununu mashamba, na kulipia

vibarua n.k. Hii hutenda kazi vizuri sana. Lakimi yaweza kutenda kazi bila fedha za mfano (na inashauriwa kwamba kwa jaribio la kwanza fedha isitumike). Sasa wakulima huuliza maswali – jinsi gani naweza kupata kipato? Weka nafasi ya ukimya wakati watumiaji wanafikiria nini watakachofanya. Kumbuka, ifikiapo mwisho wa mchezo wa gololi, lazima wawe na jibu kuhusu jinsi ya kupata fedha, hata kama hawapati gololi yeyote.

- Dakika ya 10-15. Ruhusu mchezo mmoja uchezwe ili watumiaji waweze kuona kama watapaa gololi au la.
- Dakika ya 15-20. Sasa rudia mchezo, lakini wakati huu waulize wote watokao ukanda wa juu ya bonde kuhamia ukanda wa chini na wa chini kuhamia juu. Hii ni kuonyesha makundi yote mawili hali gani inatokea iwapo utapata au kukosa maji. Hii husaidia watokao ukanda wa juu kuwaonea huruma watokao ukanda wa chini.
- Dakika ya 20-30. Marudio. Muhutisari wa harakati binafsi la kupata kipato/vyanzo vya mapato.

Mafunzo ya vyanzo mapato katika usimamizi wa maji – kwamba maji yaweza kuleta faida isya ya moja kwa moja. Waulize wakulima kama wanaona baadhi ya mambo haya yakitokea kwenye mto wao.

AWAMU 4. Saa la tatu. Harakati za pamoja na mazingira ya kuchukuliana na upungufu wa maji.

Hii awamu huonyesha kwamba watu binafsi na jamii yaweza kuamua kutumia maji kwa busara zaidi kuhakikisha kwamba mahitaji ya watu yanakidhiwa na kwamba maji yanagawiwa kutokana na mahitaji ya ukanda wa chini kuletelea ufanisi wa hali ya juu na faida kubwa

- Dakika 10 za mwanzo. Utangulizi wa hatua hii ya mchezo. Madhumuni: Kila jamii yahitaji kutafuta masuluhisho muafaka ya kushirikiana maji. Nini chahitajika kutokea? Watu wanafanya nini? Ni sheria gani ndogondogo zinazohitajika? Jinsi gani maji yatagawiwa kwa usawa zaidi? (Tafadhali hakikisha kwamba mjadala hutokea kwanza kuhusu hili – tazama hatua ifuatayo)
- Dakika ya 10-20. Wakulima kwa pamoja wajiadili mapendekezo yao kabla ya kuruhusu mtiririko ya msimu mpya wa gololi. Hii kumaanisha kwamba wakulima wote wnaozunguka meza wajiadili suluhisho la kundi katika ugawaji wa maji
- Dakika 20-35. Mizunguko mbalimbali kucheza ili jamii iweze kuwa na namna bora iwezekanayo ya kugawa maji kwenye bonde mto lote. Kila mzunguko hutumika kurekebisha ugawaji wa maji ili kuwe na ushirikiano sawa kutokana na mahitaji.
- Dakika ya 35-45. Marudio. Muhtasari la haraka la kilichjotokea. Hii njia/mbinu ya pamoja au ya kikundi ikilinganishwa na njia/mbinu binafsi.

AWAMU 5. Kipindi cha mwisho. Mjadala wa vikundi

- Dakika 5 za mwanzo. Utangulizi wa hatua ya mwisho. Madhumuni: Wakulima lazima wajiadili masomo waliyojifunza, jinsi gani watayatumia masomo hayo, kama namana hii imekuwa ya manufaa na kwa nini? Msaada gani unaohitajika? Haya makundi ya wakulima lazima yamteue mmoja wao kuwa mwandishi, ili aweke kumbukumbu na kuwasilisha mjadala wao.
- Dakika ya 5-10. Wakulia wagawanyike katika makundi. Pendekeza makundi matatu kwa ujumla.
- Dakika ya 10-35. Wakulima wajiadili mchezo, mafunzo waliyojifunzo, mahitaji, na msaada wa kitaasisi unaohitajika. Mwandishi aweke kumbukumbu.

- Dakika ya 35-55. Taarifa toka kwa mwandishi wa kikundi.
- Dakika ya 55-75. Hii hufuatiwa na hitimisho la mwisho na mjadala. Hakikisha kwamba orodha ya dondoo kuu, mafunzo waliyojifunza na masuluhisho yaliyo sahihi inatengenezwa.
- Dakika ya 75-85. Tathmini rasmi ya siku. Kura ya wakulima ya marejesho yao juu ya jinsi siku ilivyokuwa. Hii inahitajika kwa kudhihirisha mradi wa mxhezo na ufuatiliaji wa mafanikio.

Mchezo wa Bonde Mto Siku ya Pili

Madhumuni ya siku hii ni kuingia kwa undani zaidi kuhusu masuluhisho na makubaliano yahitajikayo ili kuanza utekelezaji wa njia mpya ya kutunza maji. Ni muhimu kwamba waandaaji waamue nini wanachotaka kitokee siku hii. Kwa mfano, kuna mapendekezo mawili, la kwanza kutoa muda kwa watumiaji wa maji au watoa maamuzi kujadili jinsi watakvayopaswa kuokoa maji ili hali wakihakikisha uzalishaji (k.m. masukuhisho ya kitaalamu), au jinsi yakuleta njia mpya za kutunza maji na kuwasaidia watumiaji asilia. (k.m. njia ya kiataasisi na kisheria). Kuna vipindi vinne vikuu kwa kila moja kama ionyeshwavyo katika Jedwali la 2.

Ingawa muundo wa kusisitiza ama makubaliano ya kitaalamu au kiataasisi umetolewa, waandaaji wanakaribishwa kutumia mifano hii kuanzisha muundo wao kwa siku ya pili. Kwa mfano chini ya mdajala wa kisheria na kiataasisi, faida au hasara za haki-miliki maji na ada rasmi za maji hujadiliwa kama njia ya kuzichanganua na kupendekeza mabadiliko. Kwa vyovyote itakavyo katika mjadala, tunawakumbusha waandaaji kwamba makusudi ya siku ya pili lazima yawekwe wazi kwa kutoa maelezo wazi ya kusudi. Hii siku huishia kwa maelezo mafupi ya mwisho na zoezi la kutathmini. Baada ya washiriki kuondoka, waandaaji wanapaswa kukutana (tathmini-baada) ama wakati huohuo au siku inayofuata kujadili ufuatiliaji.

Jedwali 2. Mapendekezo ya kuchanganua majadiliano ya siku ya pili

Majadiliano ya kitaalamu kwa watumiaji maji/wafanya maamuzi	Majadiliano ya kiataasisi na kisheria kwa watumiaji maji/wafanya maamuzi (Pamoja na haki na ada iliwa ni mfano)
Kipindi 1. Fanya muhtasari wa mambo ya siku iliyo tangulia, matokeo na madhumuni yake na kutambulisha siku ya leo. Madhumuni ni kuwaleta watumaji wote kujadili njia gani zinazoweza kukubalika kugawanya maji wakati huo huo kudumisha tija - k.m. uchaguzi wa mazao, tarehe za kupanda n.k. [Dakika 15-30]	Kipindi 1. Fanya muhtasari wa siku ya pili, matokeo na madhumuni yake na kutambulisha siku ya leo. Madhumuni ni kuwaleta watumaji wote kujadili njia zinazokubalika kutekeleza makubaliano mapya, sheria ndogondogo na kama muhimu taasisi. Hii itafanyika kwa mdahalo juu ya faida na hasara za ada ya maji na hati miliki [Dakika 15-25]
Kipindi 2. Toa fursa kwa watumiaji wote kujadili kikamilfu mbinu zote mbalimbali wanaazofikiri zinaweza kufanyakazi kudumisha kipato wakati huo huo wakipkoa maji. Nini walichoona wakati wakipanda mpunga? Katika kipindi hiki wataalamu wa nje wanapaswa kuongeza mbinu (Tazama Kiambatisho D juu ya mbinu za kuokoa maji yanayotumika kwa watumiaji wakubwa katika Usangu kwenye mkutano wa mwaka 2000) [Saa 1-2]	Kipindi 2. Gawanya kundi katika makundi madogo mawili. Kila kundi dogo litaridhia hoja ya haki-miliki na ada ya maji au badala yake wataisitiza kuwa muundo wa sasa wa haki-miliki na ada unakwamisha usimamizi wa maji na unaathari hasi kwa wenyeji kupata maji. Anza kwa kuuliza kutoka kwenye kundi ni nani ataridhia hoja – hii itawapa fursa ya kila kundi dogo kuundwa na watu wanaoamini hoja hiyo. Toa fursa kwa kila kundi dogo kuwa na muda na nafasi kujadili hoja yao, kuteua mtunza muda, msemaji na mwandishi [Saa 1-1.5]
Kipindi 3. Toa kipaumbele kwa mbinu hizo kwa mfumo wa kupiga kura [Dakika 30]	Kipindi 3. Sikiliza hoja zote mbili zinazoelezewa kama mdahalo (kwa hoja zote mbili zikitolewa na wasemaji wakuu) [Dakika 40]
Kipindi 4. Ni cha kukusanya makubaliano ya wakulima ili waweze kujaribu mbinu hizi. Ni asasi gani nyingine zinahitaji kushirikishwa? Nini taasisi rasmi zinahitaji kufanya? Jinsi gani tunaweza kuoneza upeo wa wakulima wenngine? [Saa 1]	Kipindi 4. Ni cha kurejea yale yaliyosemwa, kabda kukubali hoja za kujenga za mbinu zote na kukubali juu ya jinsi ya kuendelea. Warsha hii inshauri nini? Ni taasisi gani nyingine zinahitaji kuhusishwa? Nini taasisi rasmi zinahitaji kufanya? [Saa 1]

Hatua inayofuata ni kwa watazamaji na waandaaji tu na ni kukusanya rejeo na kupata mamsomo kutokana warsha – Jinsi gani hizi siku mbili zimwfanikiwa? Ni matokea gani inapaswa wafadhili (k.m. DFID) kuyajua?? Kiambatisho C inatoa mfano wa fomu ya tathimini iliyotumika.

Hatua ya tathimini baada ya Mchezo

Katika hatua hii, waandaaji wanapaswa kuwa wazi kuhusu makubaliano mapya yaliyojadiliwa kwa njia yenye maana ili wahitaji kuyafuatilia baadaye. Kwa maneno mengine, ni jinsi gani mambo ya kitaasisi na makubaliano mkabala yanaweza kueundelzwa na wadau na wawezeshaji wa huu Mchezo? (Makubaliano mkabala yanahusu msaada wa pande mbili – yaani utekelezaji kutoka upande mmoja au zaidi unatekelezeka wakati unajegwa katika utekelezaji wa makubaliano yaliyotangulia ya upande mwingine) Maswali mbali, bali yatapaswa kuwekwa hapa:

- Ni hatua gani halisi zilikubaliwa na washiriki wa mchezo?
- Ni ratiba gani waandaji/washiriki wengine walikubaliana?
- Ni njia gani zinazoweza kutekeleza kwa mafanikio ili ratiba hii ifuatiliwe?
- Ni kitu gani kinachopaswa mwezeshaji/washiriki kufanya kuweka kwenye ratiba?
- Ni jinsi gani mafanikio yataweza kufuatiliwa?
- Nini kinachotokea kama upande moja au zaidi unaitikia makubaliano yakioansizhwa na huu mchezo polepole sana?
- Ni jinsi gani mlolongo wa makubaliano ya pande mbili yatazungumziwa na kutekelezwa (Kwa mfano “watumiaji wa bonde maji letu wamekubaliana kufungua maji kwenye mkondo wa chini wakati wa kiangazi kama ada zitapunguzwa kwa 50% na OBM)

Hitimisho

Tumefanya tathimini ya awali ya mchezo huu. Katika uchunguzi kifani wetu, wachezaji wamenufaika kwa kuwa na siku mbili na ratiba iliyopangwa na kuongozwa kwa kiwango cha hali ya juu kuchanganua kwa undani mambo mbalimbali. Wachezaji waliweza kutumia ezouefu wa kujadili mambo, lakini hawakuhitaji mafunzo yeyote mahususi ya awali. Katika hali ya usalama na yenye mazingira ya kirafiki, mchezo umeonyesha viwango mbalimbali vya umwagiliaji, riziki zitegemeazo maji na usimamizi wa bonde mto katika ngazi ya mahali maalumu. Huu mchezo umethibitisha mahusiano mstari rahisi kati ya utoaji maji katika mkondo wa juu na upungufu wa maji katika mkondo wa chini (Mahusiano haya yanaweza kuonekana wazi kwa atu wa nje, lakini mara kwa mara mmoja angeweza kusikia kuwa watumiaji wa mkondo wa juu hawakuelewa matokeo ya vitendo vyao kwa watumiaji walio umbali wa takribani km 50). Mchezo umetoa mapendekezo mengi kufuatia utatuzi na kuweka wazi kwa watumiaji kuwa wameshikilia ufunguo kusimamia maji kuliko kutegemea mawakala na utatuzi kutoka nje (ingawa mapendekezo muafaka kutoka kwa wataalamu yalipokelewa na washiriki). Kujenga makubaliano kulitiwa moyo na huu mchezo hususani juu ya makubaliano kuanza mikutano ya bonde maji kugawanya maji. Haya matokeo ya kujenga hurejea vizuri matokeo ya D’Aquino na wengine (2003) ambao wanatoa hoja za mfumo wenye kuhimili mazungumzo juu ya mapendekezo na uwezo wa ufanyaji maamuzi kwa pamoja kuliko kulazimisha azimio dhahiri.

Kwa kurejea maoni ya Barreteau na wengine (2001 kifungu 2.13) (“Taswira isiyoridhisha au tabia ya imani mbaya kwa namna nyingine hujitokeza katika majadiliano ya uhalali wa muundo katika kuwakilisha uhalisi”), tunaliona hili kama iliyobuniwa hususani katika huumchezo wa bonde mto ikiwa muundo huhusisha mikakati binafsi ambayo hujenga juu ya ‘imani mbaya’ ambayo inaweza baadaye kutofautiana na mikakati ya pamoja ambayo hujengwa zaidi juu ya muundo ya kimaadili duniani. Hizi hisia bayana zilizoonyeshwa na washiriki mwishoni wa awamu ya pamoja ya mchezo zilikuwa halisi; swali ni kama hizi zinaweza kutafsiriwa kwenye vitendo vya maana na vya muda mrefu kutokana na uhalali mpana kwa watumiaji wasiokuwepo kwenye warsha.

Hii warsha umewawezesha asasi za msaada kuona taswira mbalimbali za migogoro na utatuzi, ikizipa fursa za kufanyakazi sambamba, badala ya kinyume na mawazo ya wenyeji. Hizi siku mbili zimetoa nyenzo kwa watafiti kupima matokeo yaliyopatikana kutokana na njia nyingine ili uchunguzi, hoja na mapendekezo ya washiriki yaweze kushughulikiwa kwa uangalifu. Kwa kifupi, tunahisi kwamba huu mchezo unawakilisha zana halisi kabisa katika kusuluhisha na kutatua migogoro kwa kupitia majadiliano ya mahali maalumu kuhusu ugawaji na kushirikiana maji na katika utafiti na mafunzo kwa watazamaji. Hii inaridhia hitimisho la Barrateau (2003) juu ya faida za baadhi ya michezo yenye shughuli nyingi kama zana za kujifunzia kwa wachezaji na watazamaji.

Hasara zinazoonekana ni kutoweza kuwahusisha wachezaji zaidi ya 35, ingawa kwa kuruhusu watumiaji wenyeji kuwa watazamaji yaweza kuongeza upeo kwa watu 50 – 60.

Hivyo, bila kutengeneza bao jingine au kucheza mara kwa mara, maonyesho ya kawaida ya huu mchezo hayatakuwa yametosha. Kunaweza kuwa na matatizo mengi iwapo mchezo huu utachezwa katika bonde maji lenye mtandao wa mabomba yanayosambaza maji, ambapo chanzo kikuu cha maji ni ya ardhini, au mahali ambapo ubora wa maji ni jambo muhimu. Kutakuwa na vikwazo kama watumiaji wataletwa kutoka sehemu tofauti za bonde maji kubwa kwa kuwa maazimio ya kijamii ambayo huu mchezo unalenga kuyapata hayataweza kuwa endelevu kitaasisi ukichukulia umbali husika. Haya mafanikio of mchezo huu humtegemea mwezeshaji, pia imeonekana na Barreateau na wengine (2001 kifungu 5.6) na Hagmann na Chuma (2002 ukurusa wa 23) “uwezeshaji wa mchakato wa ubora wa hali ya juu unaoongozwa na maono mazito, ufahamu na utamaduni wa uchunguzi unafikirika kuwa msingi wa kuruhusu uwezekano wa zana za mafunzo na mbinu za mchakato. Ni dhahiri kuwa, uteuzi wa mwezeshaji unahitaji nadhari ya uangalifu.

Pia kwa makusudi hatukuchunguza kupitia mahusiano nyeti ya nguvu ya kijamii ya huu mchezo isipokuwa pale yanapoibuka kupitia mahali katika bonde maji. Chakufurahisha, uamuzi au mwelekeo huu unadhihirishwa na Barreateau na wengine (2001) wakati walipokumbana na hoja zanzofanana na hizi katika mchezo wao wa umwagiliaji.

Inafaa kujua (ukirudia mawazo kutoka kwenye Kongamano la Maji na Migogoro la Montoellier) kuwa zana hizi ni sehemu ya mchakato mpana na hazipaswi kutegemewa kipekee. Kwa kweli, kama zikitumika kipekee au bila ufuatiliaji wa kutosha, zoezi hilo laweza kibua matarajio na mambo yatokanayo na mazingira ya matatizo zaidi kuliko ilivyokuwa hapo mwanzoni.

Ingawa tathmini ya muda mrefu ya mchezo huu haijawezekana kutokana na ukosefu wa muda wa kutosha, watunzi wanamatumaini kuwa muundo wa warsha hii utaweza kupelekwa mbele kama moja ya mbinu za usuluhishi wa migogoro katika Kanda hii. Hili linahitaji kufanyika kwa uangalifu; Hagmann na Chuma (2002) wametahadharisha kuwa kuongeza upeo siyo jambo rahisi la kushauri kurudufu zana badala yake kulenga katika ‘kuboresha mchakato wa mafunzo’. Kuna manufaa kutokana na msaada wa msingi wa vikundi na kwa nyongeza, huu mchezo utarejewa kama sehemu ya mtaala wa jumla wa stashahada ya umwagiliaji, na tunaamini yawezekana kuwa sehemu ya Mpango wa Mjadala kwa Taasisi ya Kimataifa ya Utunzaji wa maji (IWMI), WWF na Wizara za Maji na Maendleo ya Mifugo na Kilimo na Chakula za Tanzania (baadhi ya watumishi wa wizara wamehitaji mialiko ijayo). Kutoka kwenye majaribio ya awali, tutawaalika wawakilishi kutoka watumiaji wenine wa maji kaatika bonde maji na kutoka kwenye Taasisi zipaswazo kusaidia watumiaji wa maji katika hilo eneo (k.m. Viongozi wa Kata, Halmashauri ya Wilaya, Ofisi ya Umwagiliaji ya Kanda na Ofisi ndogo za Bonde Mto). Hawa waalikwa ni sehemu ya muundo and vigezo ambavyo vinahamasisha makubaliano endelevu ya muda mrefu yaliyofanywa na wakulima, ingawa kukosekana kwa msaada wa nje umeangaliwa na wakulima (“ni juu yetu”, kama mmoja wa washiriki wa mchezo alivyosema).

Hitimisho letu lingine ninakubaliana na Bousquet na wengine (2001) kwamba michezo ya malisili huwakilisha eneo tajiri kwa utafiti ukifungamanisha idadi ya mashamba ya mafunzo ya nadharia ikiwemo nadharia ya mchezo, muundo wenye msingi wa wakala na mifumo ya kusaidia uamuzi.

Shukurani na Hati - miliki

Huu Mchezo wa Bonde Mto uliundwa kwa mara ya kwanza katika Chuo Kikuu cha Anglia Mashariki, Uingereza mnamo mwaka 2000 na Bruce Lankfors. Huu mchezo uliendelezwa chini ya Mradi wa RIPARWINI (Kuongeza Tija ya maji ya Umwagiliaji na Kuruhusu maji kwa Mahitaji Miongoni mwa Sekta) ukifadhiliwa na Idara ya Maendeleo ya Kimataifa (DFID) chini ya Mpango wa Maarifa na Utafiti (KAR) na R8064 na unasimamiwa kwa ushirikiano kati ya Kikundi cha Maendeleo ya Ng'ambo (ODG) ya Chuo Kikuu cha Anglia Mashariki, Uingereza, Programu ya Utafiti wa Usimamizi wa Maji Ardhi (SWMRG) ya Chuo Kikuu cha Sokoine cha Kilimo, Tanzania na Taasisi ya Kimataifa ya Usimamizi wa Maji (IWMI Ofisi ya Afrika Kusini).

Jarida hili kwa shukurani linatambua mchango katika mradi huu wa N. Hatibu, H. Mahoo, S. Tumbo, D. Merrey, B. Van Koppen, H. Levite, M. McCartney, H. Sally, K. Rajabu, R. Kadigi, O. Wahure, J. Kashaigili, J. Cour, M. Magayane na R. Masha. Shukurani pekee zimwendee M. Mdemu kwa mchango wake kwenye huu mchezo wa bonde mto. Hakuna hati miliki ya mchezo huu – nakala zaweza kufanywa na yeyote anayehitaji kutumia hii zana katika majadiliano shirikishi kuhusiana na usimamizi wa maji. Tunashauri kwamba tabia na sifa-bainifu za bonde mto la mahali maalumu ziingizwe. Popote pale iwezekanavyo unapaswa kurejea ripoti hii kwa kufuata nukuu ifuatayo:

Lankford, B.A. and Sokile, C.S. 2003. Mwongozo wa Mchezo wa Bonde Mto: Zana ya Mazungumzo. Mradi wa RIPARWIN. (Kuongeza Tija ya maji ya Umwagiliaji na Kuruhusu maji kwa Mahitaji Miongoni mwa Sekta). Kikundi cha Maendeleo ya Ng'ambo (ODG) cha Chuo Kikuu cha Anglia Mashariki, Uingereza; Programu ya Utafiti wa Usimamizi wa Maji Ardhi (SWMRG) ya Chuo Kikuu cha Sokoine cha Kilimo, Tanzania; Taasisi ya Kimataifa ya Usimamizi wa Maji.

KIAMBATISHO A

Kanuni za msingi kwa Mchezo wa Bonde Mto

Kabla ya kucheza – Mchezo wa majaribio

1. Mwezeshaji lazima apitie hatua tano za siku ya kwanza kabla ya washiriki kuwasili. Inashangaza jinsi gani ilivy rahisi kusahau mambo ya msingi, na mwezeshaji lazima aonekane anaumudu mchezo.
2. Kumbuka kucheza mchezo ili upate fundi wa kurekebisha tatizo lolote kabla ya washiriki kuwasili.
3. Kabla ya kucheza – nani apaswaye kuwepo?
4. Mwezeshaji mkuu –hasa yule mwenye ufahamu wa masuala ya kitaasisi/kijamii, na awezaye kesaidia kubuni hiyo siku na kuchagua washiriki
5. Angalau mmoja au wataalamu wasaidizi wawili ambao wanafahamu masuala ya utunzaji maji
6. Waweka kumbukumbu wazuri, kama siyo wataalamu wasaidizi wa hapo juu. Pamoja na mchukua filamu ya video
7. Takribani watumiaji maji 30 – 35 kutoka pande mbalimbali za bonde maji dogo; wakulima, watokao mwanzoni juu, watokao mwishoni chini, watumiaji wa majumbani, wafugaji, wavuvi. (Wendi waweza kutumiwa kama watazamaji, lakini 35 ni takribani idadi ya juu ya wachezaji).

Baadhi ya hawa waweza kuwa viongozi wa jadi.

8. Wadau wachezaji au watazamaji – msisitizo halisi juu ya nani aweza kuhusika kuwasaidia watmiaji maji; wakufunzi bingwa wa umwagiliaji, wafanyakazi na maafisa kutoka Wizara ya Kilimo na Chakula, Ofisi ya Umwagiliaji ya Kanda, Wizara ya maji na Maendeleo ya Mifugo na Wilayani.

Kabla ya kucheza - Utangulizi

1. Madhumuni ya mradi wa maji, utunzaji wa maji kimataifa, ugawaji katika sekta-ingilivu, kuongeza uzalishaji, kutatua migogoro, kuongeza mahotaji ya sekta nyingi, kutofautisha kati ya mahitaji na matakwa – jinsi gani ya kukidhi mahitaji na siyo matakwa. Jinsi ga kukidhi mahitaji ya walio maskini zaidi katika bonde maji dogo?
2. Tafadhali wakumbushe washiriki kuwa kwa maskini walio pande za mwisho wa bonde (watumiaji wa majumbani, wafugaji au wakulima wadogo wadogo wa mpunga) kiasi kidogo chamaji kina thamanin kubwa kwa maisha ya, wakati kwa matajiri waishio mwanzoni mwa bonde kuachilia kiasi hicho labda hakukuwa na tofauti yeyote au haitatambulika.
3. Madhumuni mahususi ya mchezo wa bonde mato – kuonyesha jinsi tuavyoweza kuboresha utunzaji ma katika bonde maji dogo lilichaguliwa. Kujifunza kutoka silu hii kuuboresha mchezo kama ukihitajika katika bonde maji lingine au kwenye kand nyingine (Rejea kwenye miradi mingine imekuwepo mahali hapa: SMUWC, RIRARWIN, RBMSIIP – na madhumuni yake.
4. Rejea ramani ya kanda, onyesha bonde maji la muhimu na mabonde maji mengine na watumiaji wa ukanda wa chini ya bonde.
5. Rejea (au waulize wataje) watumiaji wengi wa maji katika bonde (k.m. majumbani, mifugo, mpunga, nazo yasiyo mpunga, aridhioevu, uvuvi, wanyama pori, \hifadhi ya Taifa ya Ruaha Mkuu, watalii, mabwawa ya umeme Mter/Kidatu)
6. Pendekeza kwamba ramani ya bonde mto itengenezwe katika wakati Fuulani – ili uweze kuirejea.

Kumbuka huu mchezo siyo uwakilishi sahihi na yawezekana kuwepo miundombinu mingi (mifereji, mabanio na mitaro ya kutolea maji) ambayo ungependa kuiweka kwemye ramani.

Wakati wa kucheza

1. Kwanza andaa, hakikisha una mabanioya kijadi (vijiti vyembamba) na ya kisasa (vijiti vinene)
2. Nenda taratibu
3. Elezea ni kitu gani washiriki watakiona, kifanye halafu elezea ni kitu gani walichokiona
4. Rudia ikiwa ni muhimu
5. Kusanya gololi zote mwishoni mwa kila mzunguko ili mchezo uwe tayari kuanza upya, na matokeo ya mchezo uliotangulia yasichanganye kile kitakachotokea baadaye
6. Kumbuka kuendesha mchezo ili upate matokeo utarajiayo kuyaona. Kwa maneno mengine, fikiria kabla ya kila mzunguko ni kitu gani wataka kuona halafu rekebisha ili upate matokeo unayoyataka. Wewe siyo mwezeshaji tu, lakini ni mwalimu pia! Fanya msimu wa kiangazi kuwa na idadi ndogo sana ya gololi na msimu wa mvua (masika/vuli) kuwa na gololi nyingi sana. Chagua mabanio madogo kwa hali ya kiasili/kijadi na mabanio makubwa kwa hali ya kisasa.
7. Hitimisha kwa kifupi mwishoni mwa kila hatua, hakikisha maswali na majibu.
8. Ruhusu majadiliano baina ya wakulima kabla ya kila mzunguko kucheza ili waingie katika

- mchezo. Mwezeshaji anapaswa kuwa makini kutoongea sana.
9. Ruhusu njadala huu kuwa huru (yaani kuwa na mtiririko huria) lakini sikiliza kile wanachoongea.
 10. Wakati jambo la manufaa linapoongewa, ungependa kuwaeleza wengine ili wote waweze kuelewa ukweli au wazo lenye manufaa
 11. Usiruke hatua yeyote – wahitaji kila msingi ujengwao umfanye kila mmoja kufikiri kuhusu jambo hilo hilo. Baadhi ya hatua zinanekana siyo za muhimu lakini bila hizo waweza kuwapoteza washiriki wako.
 12. Elezea kwamba huu ni muundo tu na siyo hali halisi inayowakilisha bonde maji dogo watumiaji wanapotokea.

Madhumuni ya kitaalamu – utunzaji bora wa kushirikiana maji

1. Tunajaribu kupata watumiaji kueleza ni njia gana wanazofahamu za kuokoa maji
2. Kumbuka, watumiaji tayari wanafahamu nini kinachohitajika kuokoa maji, n akushirikiana maji kwa usawa zaidi baina yao na watumiaji wengine.
3. Mara zote fuata maoni ya wachezaji – pata somo na makubaliano kutokana na wanachosema. Usijaribu kusisitiza mabo mengi, bali ongoza mchezo vizuri.
4. Hivyo, kwanza waombe wa orodheshe njia zote za kuokoa maji.
5. Halafu tumia Kiambatishi B labda kupendekeza njia nyingine zaidi za kuokoa maji
6. Sasa, mara baada ya njia zote kuorodheshwa (kwenye karatasi) tumia vikundi kupanga njia hizo kwa umuhimu wa kila njia katika kuokoa maji – njia ambayo kundi zima litakubaliana nayo hata kama inawezakuwa ngumu itahitajika mratibu au msaada kutoka nje.
7. Sasa jadili hii orodha ya mpangilio wa kipaumbele vya maoendekezo ya kitaalamu ya kuokoa maji – kwa maneno mmengine hakikisha kuwa orodha hii ni shihi kwa kuwarudushia waipitie tena na kuwapa nafasi ya kupendekeza mabadiliko.

Madhumuni ya kitaasisi – njia za kutekeleza njia za kitaalamu za kuokoa na kushirikiana maji

1. Hapo juu tumeorodhesha njia za kitaalamu za kuokoa maji
2. Sasa, tunachokusudia ni kujaribu kuwapata wakubaliane kwamba njia za ushirika za utunzaji maji zinafaa zaidi na hii hutumika katika kiwango cha shambani kati ya wakulima majirani mpaka kiwango cha mfumo mzima kati ya wakulima kwenye asasi za watumiaji maji na kwenye kiwango cha bonde maji dogo kati ya mifumo ya umwagiliaji.
3. Hivyo, tunalenga kuwauliza wao kufikiria jinsi ya kutekeleza hizi njia za kitaalamu za kutunza na kugawana maji vizuri.
4. Kwa hiyo, dhumuni letu ni kwao kutambua taasisi zenye msaada na zinazokwamisha. Kwa maneno mengine ni taasisi gani wanazoweza kusikimbilia (au wanapaswa kuzikimbilia) kupata msaada wa kuokoa na kugawana maji, na taasisi zipi hazina msaada kwao (na ambazo haziwajali au kuwazuia)
5. Kwa vyovyote, tunawaomba kufikiria njia za kuanzisha taasisi mpya kama ni muhimu. – kamati ya utunzaji ya maji ya bonde maji dogo?
6. Kwa kuuliza watazamaji kutoka taasisi nyingine (k.m. RBWO, Wilaya ya Mbarali tunaweza kujaribu kupata pande zote kufanya kazi pamoja kwa njia za ufanisi zaidi
7. Pata marejesho kutoka kwa wakulima juu ya mchezo

8. Je mchezo ulikuwa mrefu sana au mfupi sana?
9. Je kuna ulazima/umuhimu wa kuwa siku mbili?
10. Je ni maboresho gani yakufanya kwenye huu mpango/utaratibu?
11. Je ni kwa vipi huu mchezo wa bao uboreshwe? Ni kitu gani ngependelea kukiona?
12. Je maelekezo yalikuwa wazi?
13. Je ulihitaji maandalizi kabla ya kuanza siku?
14. Nani mwingine amabye kikundi kingependa kumwona anawakilishwa hapa? Je kuna watu mashuhuri katika kijiji chako ambao wangepaswa kuja? Ni taasisi gani nyingine ambazo zinakosekana?

Ufuatiliaji – Kufanya muhtasari na kuchanganua matokeo ya mchezo

1. Je watumaji wote waliwakilishwa? Taasisi tazamaji zote ziliwakilishwa?
2. Ni mapendekezo gani ya kitaalamu yaliyorodheshwa? Je mapendekezo yote yaliorodheshwa?
3. Ni njia gani za kiutawala na kitaasisi ambazo kikundi kilikubaliana kutekeleza haya mapendekezo ya kitaalamu?
4. Je kuna uwezekana wa njia zote za kitaasisi na sheria ndogondogo zilizo rodheshwa na kujadiliwa kufanyika?
5. Ni taasisi gani kubwa mnaohitaji kuwasaidia kutatua mataizo yenu? Ni taasisi gani isiyowasaidia kugawna maji na kutatua matatizo yenu?
6. Pendekeza kwamba hii filamu ya video ya majadiliano ionyeshwe kwa washiriki
7. Ufuatiliaji wa namna gani unahitajika? Jinsi gani twaweza kufuatilia maendeleo ya haya makuliano mapya?

Tathmini binafsi ya mwisho

1. Je jambo lolote lililotarajiwa limetokea? Ni lipi? Je hii ilimaanisha chochote?
2. Je kila mmoja alipata nafasi ya kuongea?
3. Je, wewe mwezeshaji uliweza kuiboresha siku? Nini ulichobadili?
4. Je ulisahau chochote?
5. Je kuna kitu chochote cha haraka unachohitaji kukiona?

Kufanya marekebisho kwenye mchezo

1. Marekebisho na maboresho yanapaswa kufikiriwa na kukaribishwa kila mara. Mchezo huu lazima uendelee
2. Kuwa mwangalifu kuingiza maboresha ambayo hayatawakilisha kile kinachotokea kwenye bonde maji – kila mara fikiria kuhusu kile unachotaribu kuboresha.
3. Rekebisha mambo madogo mdogo yanayoleta mkanganyiko baada ya kujaribu kucheza – kama utaruhusu hayo kuendelea mchezo mkuu utakwamishwa na hitilafu hizi

KIAMBATISHO B

Mfano wa barua ya mwaliko

CHUO KIKUU CHA SOKOINE CHA KILIMO
KITIVO CHA KILIMO
IDARA YA UHANDISI KILIMO NA MIPANGO ARDHI
PROGRAMU YA UTAFITI WA USIMAMIZI WA MAJI ARDHINI
S. L . P. 3003 MOROGORO - TANZANIA
SIMU: 255 23 3847 au 255 23 2604216
Baruapepe: swmrg@suanet.ac.tz
FAKSI: 255 23 3718

Kumb. yetu:

Kumb. yako:

Tarehe: 14/7/2003

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Mpendwa Bw. au Bibi

YAH: MWALIKO KUHUDHURIA WARSHA YA MCHEZO WA BONDE MTO

Tafadhali rejea kichwa cha hapo juu.

Mchezo wa Bonde Mto ni igizo-funzo lenye msingi wa mfano halisi ambao unaonyesha jinsi muundo wa matumizi ya maji kati ya pande za chini na juu yam to unavyotokea na kutoa suluhisho la uhaba wa maji na migogoro kupitia mazungumzo/mijadala baina ya wadu mbalimbali. Tumeuchezesha huu mchezo mara mbili sasa ma tunaamini utauona wenye kufaa na wakuvutia.

Mradi wa kuongeza uzalishaji wa umwagiliaji na kuruhusu maji kwa sekta ingilivu (RPARWINI) chini ya Mpango wa Utafiti wa Usimamizi wa Maji ardhini wa Chuo Kikuu cha Kilimo cha Sokoine kimeandaa Warsh ya Mchezo wa Bonde Mto itakayofanyika kama ilivyoelezwa hapa chini:

Tarehe: 29 & 30/7/2003

Mahali: Chuo cha Mafunzo ya Kilimo cha Igurusi, Mbeya, takribani kilometa 50 Mashariki ya mji wa Mbeya pembezoni mwa barabara ya Dar/Iringa.

Kama mdau mkuu katika usimamizi wa maji katika Bonde la Rufiji, tungependa kukualika katika warsha hii mahsusi. Tunakuomba ujiharimie mwenyewe. Thibitisha ushiriki wakko kwa kupitia anwani za hapo juu au moja kwa moja kwa mratibu wa warsha kupitia Simu: 0744 645142 au baruapepe: sokile@email.com

Ninatumaini kukuona katika warsha hii

Wako wa dhati

Prof. Nuhu Hatibu

Kiongozi wa Timu SWMRG

KIAMBATISHO C

Fomu ya Tathmini

FOMU YA TATHMINI YA WARSHA YA MCHEZO WA BONDE MTO

Mpendwa Mshiriki

Tunashukuru kwa kiwango cha hali ya juu ushiriki wako katika warsha ya Mchezo wa Bonde Mto.

Kwa hiyo tafadhali tunakuomba ujaze hii fomu ya tathmini kwa uaminifu. Maoni yako yatatufanya sisi tuboreshe warsha kama hii baadaye.

1. Je MBM ni mfano halisi wa kutosha kuwakilisha ili kuleata ufahamu wa uhusisono wa watumaji wa ukanda wa juu na ukanda wa chini?
 - a. Unawakilisha kwa kiwango cha juu
 - b. Unawakilisha kwa wastani
 - c. Unawakilisha kwa kiwango duni
 - d. Hauwakilishi uhusiano wowote
2. Umeonaje hatua tofauti za MBM katika nyanja ya maendeleo ya matumizi mbalimbali ya maji katika bonde mto kwa nyakati tofauti?
 - a. Ni kweli kwa kiwango cha juu
 - b. Ni kweli kwa wastani
 - c. Ni kweli kwa kiwango cha chini
 - d. Siyo kweli kabisa
3. Unafikiri MBM una wajibu mwafaka kuleta watumiaji maji kuelewa na kutafuta maoni yao juu ya mikakati binafsi ya kupata maji?
 - a. Ndiyo, kama ndiyo
kwanini?-----
 - b. Hapana, kama hapana
kwanini?-----
 - c. Hakuna tofauti,
kwanini?-----
4. Unafikiri kitu gani kingefanywa na watu binafsi ili kuwafanya watumie maji kwa usawa? -----

5. Unafikiri kitu gani kingefanywa na watu binafsi ili kuwafanya watumie maji kwa ufanisi kiuzalishaji? -----

6. Mikakati gani ya kuhifadhi wa maji unafikiri ingepaswa kufanywa na watu binafsi ili kutatua tatizo la uhaba wa maji? -----

7. Unafikiri MBM una wajibu mwafaka kuleta watumiaji maji kuelewa na kutafuta maoni yao juu ya mikakati ya jamii ya kupata maji?
 - a. Ndiyo, kama ndiyo
kwanini?-----
 - b. Hapana, kama hapana
kwanini?-----

- c. Hakuna tofauti, kwanini?-----
8. Unafikiri kitu gani kingefanywa na jamii ili kuwafanya watumie maji kwa usawa? -----

 9. Unafikiri kitu gani kingefanywa na jamii ili kuwafanya watumie maji kwa ufanisi kiuzalishaji?

 10. Mikakati gani ya kuhifadhi wa maji unafikiri ingepaswa kufanywa na jamii ili kutatua tatizo la uhaba wa maji? -----

 11. Fikiria muda ulioyengwa kwa kila kipindi; ungekuwa na jambo gani la kusema kuhusu muda kama mchezo ungehezwa kijijini na watumiaji maji asilia? -----

 12. Kuna maoni yeyote kuhusiana na muda uliopangwa kwa kila kipindi cha MBM? -----

 13. Je unafikiri MBM waweza kuwa kama nyenzo ya kupunguza migogoro ya matumizi ya maji kupitia igizo-funzo?
 - a. Ndiyo, kwa nini? -----

 - b. Labda, kwa nini? -----

 - c. Hapana hata kidogo, kwa nini? -----

 14. Unafikiri ni kitu gani twahitaji kufanya kuboresha MBM?
 - i -----

 - ii -----

 - iii -----

15. Una maoni yeyote kwa MBM?

i -----

ii -----

iii -----

16. Umeonaje uwezeshaji wa MBM?

- a. Mzuri
- b. Wastani
- c. Duni

17. Ungeshuri nini kiboreshwe kati kuwezesha MBM? -----

Ahsante sana

KIAMBATISHO D

“Fikiri kuhusu utunzaji wa maji ukihusisha na mchezo wa bonde mto”

Maswali haya yamepangwa pamoja katika vichwa na miundo kukusaidia kuanza kufikiri kuhusu utunzaji wa maji katika njia mmbalimbali.

Mpango na kalenda

Ni lini vitalu vya mwanzo nya mpunga vinatengenezwa?

Ni lini shamba la mwisho la mpunga linavunwa?

Nini kikwazo kikubwa kwako? Nini kinacho athiri kalenda (ardhi, maji, kazi, mbegu, nyenzo, fedha)?

Ni vipi sheria zenu ndogo ndogo kuhusu kupanda wakati wa kiangazi? Ni nini mipango yenu ya msimu ujao wa kiangazi?

Je unabadilisha mfumo wako wa utunzaji maji kwenye mwaka wa ukame, ukilinganisha na mwaka wenye mvua za kutosha? Kama ndivyo kwa vipi?

Ni aina gani ya mpunga inayopanda? Unachukuwa siku ngapi kukomaa/kuvunwa?

Kalenda na Maswali ya muda

Haki maji yako ni ya lini?

Nini kinachochelewesha kati ya umwagilaji wa kwanza na kupandikiza?

Ni muda gani unatumika kumwagilia shamba mwanzoni mwa msimu?

Ni muda gani unapaswa kutumika kumwagilia shamba mwanzoni mwa masimu?

Ratiba ya maji, maswali ya ugawaji na mzunguko

Unawezaje kueleza kama maji hayatoshi kwa mazao? Ni lini mazao yanaathirika?

Ni vipi unaamua wakati wa kuanza kumwagilia na wakati wa kuacha kumwagilia shamba?

Unaruusu maji kufikia kina gani?

Unafanya mzunguka baina ya mashamba?

Jinsi gani maji yanagawanywa baina ya mashamba? Ni wakati gani unaamua kufanya hivi?

Mizunguko inachukuwa muda gani? (yaani ni muda wa siku ngapi sinazopita kabla maji kurudia kwenye shamba lile lile?)

Maswali ya maeneo

Shamba lako lina eneo ukubwa gani?

Je hili ni eneo la shamba moja au mashamba mengi madogodog katika sehemu tofauti?

Mfumo huu wa kilimo unaathiri vipi mipango yako ya utunzaji maji?

Ni kiasi gani cha eneo ulilopandikiza (jibu katika eneo kwa hekta kwa juma au kwa siku 10 au kwa mwezi au idadi ya mashamba kwa juma au kwa siku 10 au kwa mwezi). (Ni kiasi gani katika mwezi wa Septemba, Oktoba, Novemba, Desemba, Januari Februari na Machi?)

Nini kinachodhibiti hiki kiasi cha eneo lililopandikizwa (yaani ninikinacholipunguza au kuliongeza?)

Maswali ya mtiririko wa maji

Haki yako ya maji ikoje? Haki yako ya maji ikoje katika nyakati tofauti za mwaka?

Ni maelekezo gani unayotoa kufuatana ufunguzi wa maji/mlango wa maji katika banio kuu?

Ni kiasi gani cha juu cha mtiririko unachotumia? (meta za ujazo, au lita/sekunde)

Ni kiasi gano cha kawaida cha mtiririko unachotumia? (meta za ujazo, au lita/sekunde)

Ni kiasi gani cha chini cha mtiririko unachotumia? (meta za ujazo, au lita/sekunde)

Ni kiasi gani cha mtiririko kwa kila shamba? (meta za ujazo, au lita/sekunde)

Je unafunga mlango mkuu wa maji? Je unufunga wakati wa mvua kubwa?

Maswali ya mahitaji na ugavi wa maji

Je hayo maji yanayopatikana yanatosha kwa hili eneo la umwagiliaji?

Ni kitu gani kinachosababisha mahitaji makuu ya maji kutoka katika shamba lako? (mvukizo? uchepechepe? Muundo wa shamba? Uvujaji?)

Ni kina gani cha maji kinahitajika kufanya tabaka la maji kusimama? Nin kina gani cha maji katika shamba lako?

Ni wakati gani unafikiri hakuna uhitaji wa maji katika shamba lako? Miezi gani, au tarehe gani?

Ni wakati gani unasimamisha umwagiliaji kabla ya uvunaji? Ni majuma mangapi kabla ya uvunaji?

Usimamizi wa maji mferejini

Je maji yatolewa kwa umwagiliaji wa shamba kwa shamba au kwa mfereji?

Ni vipi unasimamia udhibiti wa maji katika mferejiwako? Ni vipi unarekebisha mtiririko wa maji?

Ni vipi maji yanabadilishwa kutoka mfereji mmoja kwenda kwenye mwingine?

Maswali ya usimamizi ya maji katika shamba

Nani asimamiaye usambazaji wa maji ndani ya hayo mashamba?

Je kina cha maji kinatofautiana ndani ya mashamba?

Unafikiri ni kuna tofauti gani ya usimamizi wa maji kati ya mashamba ya wakulima wadogo wadogo nay ale ya NAFCO?

Je mfereji wa pembezoni uliozama ndani ya shamba unaongeza matumizi ya maji?***

Ni ipi kati ya mbinu hizi inatumai maji zaidi – kupanda kwenye vumbi au kupandikiza?

Maswali ya Mahali

Mi wapi unapoweka vitalu vyako? Vitalu hivi vimewekwa pamoja?

Ni mashamba gani unayopandikiza na kuyamwagilia kwanza?

Maswali ya ufanisi wa maji (upotevu wa maji)

Je unapata upotevu wa maji ya umwagiiaji? Upotevu wako ni mkubwa au mdogo?

Upotevu mkuu unatokea wapi – yaani kutokea wapi unadhihirika? Nani anausababisha?

Ni wakati gani unafikiri upotevu mkuu unatokea?

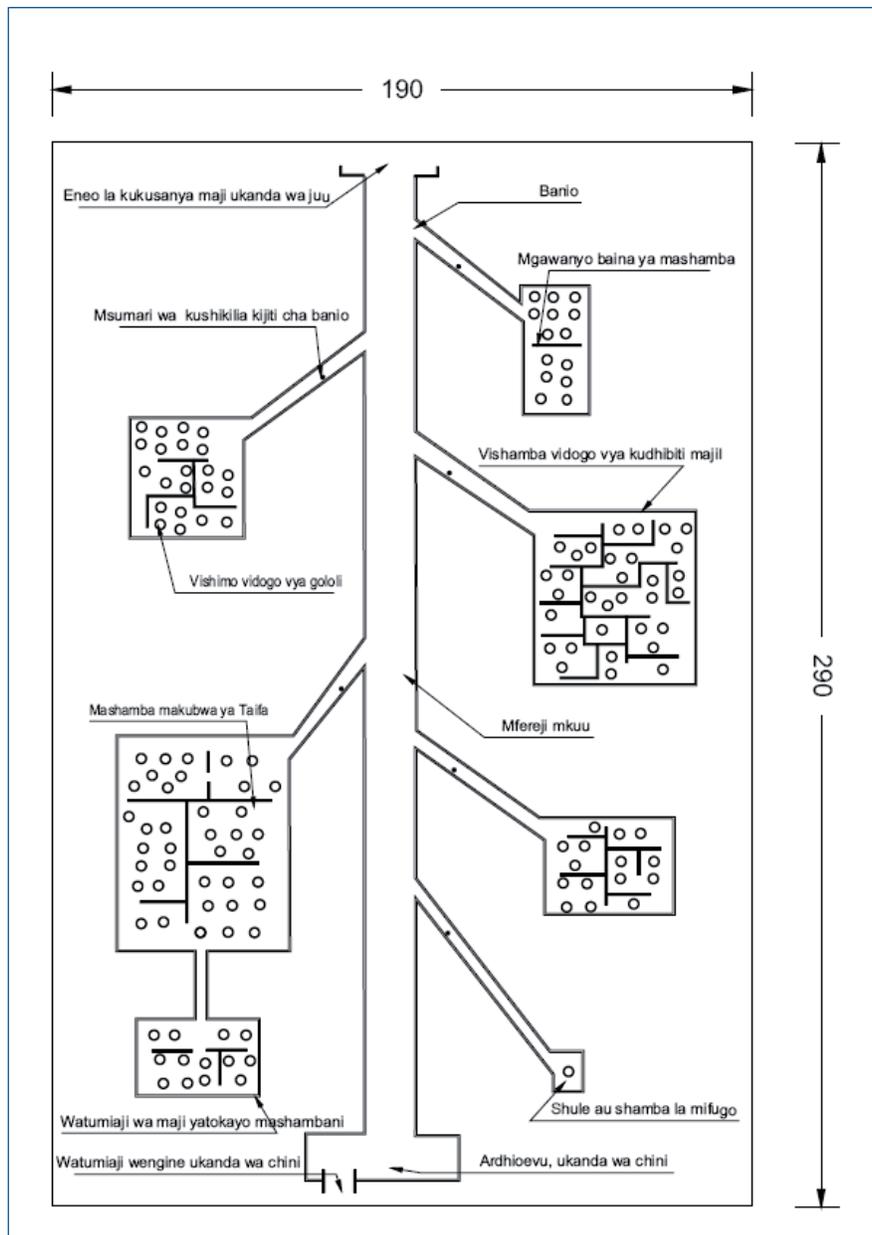
Nini athari au matokeo ya upotevu huu?

Je kuna chanzo za upotevu huu unachoweza kukirekebisha?

Je kuna nyakati ambapo mashamba yako yanatumia maji lakini hayapandwi mpunga? Hii ni kwanini?

Je maji yarudi kule mtoni? Ni asilimia gani ya maji yaliyochepushwa yanarudi mtoni?

Ni nani atumiaye maji ya ziada? Ni kiasi gani cha ardhi kinamwagiliwa kutumia mchuruziko wa maji kutoka kwako?



Watu kufanya maamuzi

Nani afanyaye maamuzi kuhusu usimamizi wa maji?

Wakati gani? Katika baraza gani?

Ni vipi haya maamuzi yanafikiwa?

Kuokoa maji

Ni vipi unafikiri waweza kuokoa maji? Ni njia gani kuu ambazo kwazo, utaweza kuokoa maji? Ni wakati gani muafaka kuokoa maji?

Ni maji kiasi gani utakachoweza kuoka kwa nyakati tofauti za kalenda ya mazao (meta za ujazo, lita kwa sekunde, au ailimia, au siku, au uvujaji?)

KIAMBATISHO E:

Muundo wa “Mchezo wa Bonde Mto” (Vipimo ni vya kukadiria katika sentimeta – tazama juu kwa maelezo ya kinaganaga)

Utondoti wa muundo wa Mchezo wa Bonde Mto

1. Vipimo vyote ni makisio na vinapaswa kuamuliwa na seremala
2. Vishimo vya gololi vinapaswa kuwa vikubwa vya kutosha kupokea gololi lakini siyo vikubwa kushindwa kutoa gololi.
3. Ubao waweza kugawanywa katika sehemu ne kurahisisha ubebaji
4. Mwinamo haupaswi kuwa mkali sana – takribani sentimeta 15 juu upande mmoja kulikoa mwingine kwa urefu wa sentimeta 290-300. Mihimili inaweza kujengwa tofauti.
5. Mashamba yamegawanya kwa vifimbo vidogo vya mbao
6. Seremala anapaswa kutengeneze mchezo kwa hatua ili jicho la uangalifu liwekwe wakati utengenezaji unaendelea kuepuka kufanyika makosa
7. Hiyo mbao inapaswa kupakwa vanishi ili kuifanya kuwa ngumu
8. Chaguo – Inawezekana kutambulisha vipengele vya nyongeza kama bwawa la hifadhi ambalo laweza kuhifadhi maji ya msimu wa mvua kwa kufunguliwa baadaye au hata visima kwa ajili ya vijiji.



APPENDIX 2

Report on the Workshop for Development of Training Materials for Training of Trainers in the Kikuletwa Catchment

PANGANI BASIN WATER BOARD

The Pangani River Basin Management Project

Report on the Workshop for Development of Training Materials for Training of Trainers in the Kikuletwa Catchment

PANGANI BASIN

HELD AT UHURU HOSTEL 6-10th April 2009

PROJECT JOINTLY IMPLEMENTED BY:

*International Union of Conservation of Nature- IUCN
The Netherlands Development Organization-SNV
PAMOJA.*

*The Government of Tanzania,
European Commission, EU-ACP Water Facility
Global Environment Facility, UNDP.*

Report prepared by:

*Willie Mwaruvanda
Basili Liheta
Leodgard Haule*

April 2009

List Of Acronyms

CBOs:	Community Based Organization
CT:	Core Team
GWP:	Global Water Partnership
IUCN:	International Union of Conservation of Nature
IWRM:	Integrated Water Resources Management
SNV:	The Netherlands Development Organization
ToT:	Training of Trainers
KCF:	Kikuletwa Catchment Forum
PBWO:	Pangani Basin Water Office
PRBMP:	Pangani River Basin Management Workshop
PMU:	Project Management Unit
NAWAPO:	National Water Policy
NSGRP:	National Strategy for Growth and Reduction of Poverty
NGO:	Non Governmental Organisation
NWDS:	National Water Sector Development Strategy
WSS:	Water Supply and Sanitation
LGRP:	Local Government Reform Programme
O&OD:	Opportunities and Obstacles to Development
PRA:	Participatory Rural Appraisal
UNDP:	United Nations Development Programme
EU-ACP:	European Union- African Caribbean & Pacific
GWP:	Global Water Partnership

Report on the Workshop for Development of Training Materials for Training of Trainers in the Kikuletwa Catchment

1.0 Introduction

The Pangani Basin Water Office is implementing the Pangani River Basin Management Project, with technical assistance from the International Union of Conservation of Nature (IUCN), the Netherlands Development Organization (SNV) and the local NGO PAMOJA Trust. The project is financially supported by the IUCN Water and Nature Initiative, the Government of Tanzania, the European Commission through grant from the EU-ACP Water Facility and the Global Environment Facility, through UNDP.

The main goal of the Project is to “strengthen Integrated Water Resources Management in the Basin, including mainstreaming climate change to support the equitable provision and wise governance of freshwater resources for current and future generations and to empower Water Users and Managers in Pangani Basin to manage and allocate water resources with consideration for climate change, the environment and other technical information, through consultative processes and the sound framework of IWRM”

The project has the following five Key Result Areas, which contributes to the achievement of the goal:

Result 1: Increased understanding of environmental, economic and social implications of different river flow scenarios under expected climatic conditions and increased capacity to collect and analyze such flow assessment information;

Result 2: Water Users strengthened and empowered to participate in IWRM and Climate Change adaptation processes through dialogue and decentralized water governance;

Result 3: Water Sector’s vulnerability to climate change understood and pilot actions generate lessons in adaptation;

Result 4: Pangani Basin Water Office coordinates other sectors and stakeholders in the development of an IWRM Plan; and

Result 5: Project implementation effectively & efficiently to the satisfaction of all stakeholders.

2.0 Objective of Training of Trainers (ToT) Programme

For the forum to be established and community participation to be realized under IWRM; the trainees will form Catchment Facilitation Teams, that will be deployed to train or raise communities awareness on different issues in regard to IWRM; entrepreneurships; community participation; gender and other cross cutting issues relating to WRM, as an initiative to strengthening the capacity of the community to manage

the resources at different levels in the catchment once the forums have been established. The TOT will equip the facilitation teams with different facilitation and training skills, methods, tools and approaches in integrated water resources management. As a result, the TOT exercise will contribute to empowering the teams with knowledge and skills, which will be transferred to the water users for proper planning and sustainable management of the water resources at their local scale.

3.0 Workshop process

One of the pre-requisites in the process of putting in place the Kikuletwa Catchment Forum is development of training materials to be used for Training of Trainers (TOT) programme covering topics in Integrated Water Resources Management (IWRM), entrepreneurs; community participation; gender and other cross cutting issues relating to WRM, climate change and adaptation strategies and the contribution of water resources in poverty reduction. Towards that end, the three experts contracted to undertake this assignment assembled in Moshi for a five day workshop to develop modules for the proposed training as described in the TOR/specific responsibilities of the experts. The workshop was also attended by the core team members in project implementation namely Mr. Mturi from SNV, Mr. Luanda from Pangani River Basin Management Project (PRBMP), Ms. Jane Kabogo from PBWO and Ms. Irene Chikira from PBWO and currently on attachment to IUCN. Ms Chikira also presided as a workshop chair.

3.1 Prelude and groundwork

- (i) The workshop started by welcome remarks from Mr. Mturi a member of the core team who wished everyone a happy stay in Moshi and hoped that the gathering would achieve its objectives. He pointed out that the main objective was to develop training material for the forthcoming TOT.

Two documents namely (i) Strengthening Participation and Planning for Integrated Water Resources Management (IWRM) Programme for Pangani River Basin, Tanzania – *Capacity Building for Kikuletwa Subcatchment Forum- TRAINERS MANUAL* by Owino J.P 2007 and (ii) Integrated Water Resources Management for River Basin Organizations: Training Manual, Cap-Net 2008 were distributed to experts as key reference materials in the process of developing training materials. This was followed by a brief presentation on the Kikuletwa Catchment by Ms Irene Chikira from the PBWO which provided key highlights on the size, subcatchments, problems, lessons and challenges for management and development of water resources in Kikuletwa Catchment.

- (ii) The experts reviewed the documents provided (see (i) above) and concluded that the manuals contained useful information which however needed to be tailored to the needs of the prospective trainees (envisaged facilitators) most of whom probably do not have a basic understanding of IWRM. It was also observed that governance issues are not clear and elaborate in the training manuals provided. Similarly it was agreed that experts would explore other sources they see relevant to the needs of the trainees such as the Global Water Partnership (GWP) training materials which can also be useful reference materials.
- (iii) Similarly, the review of the documents together with a presentation on the Kikuletwa catchment revealed a number of gaps and pointers on areas that need to be covered during the training. Areas identified as missing include conflict management, gender mainstreaming, participatory planning, financial management, and governance aspects. It was also the opinion of experts that trainees need to be equipped with training methodologies and facilitation skills which are a basic

requirement for effective engagement of communities towards formulating the Kikuletwa Catchment Forum (KCF). This would constitute a more holistic approach in the capacity building of the trainees and the entire process of establishment of the envisaged forum.

- (iv) As part of ground setting and having a focused mind and approach in the process of developing training materials and subsequent training and formulation of the KCF, the Pangani Basin Water Officer was categorical on the following as elements that must also guide the exercise namely (i) the establishment of the catchment forum is intended to operationalize the National Water Policy (2002) which among other things aims to empower communities to manage water resources at the lowest appropriate level, (ii) responsibilities of water users, operations and management skills, water revenues and expenditure, management and monitoring mechanisms and the role of water resources in poverty alleviation, (iii) the emerging issues of climate change and adaptation measures and promotion of alternative livelihood activities that minimize pressure and dependence on natural resources.

3.2 Identification and preparation of modules

Based on the analysis of information materials provided by IUCN/PBWO and guidance from the core team members the following modules identified and agreed for preparation

- (i) Stakeholder participation in Water Resources Management (Mr. Haule)
- (ii) Participatory planning for water resources (Mr. Haule)
- (iii) Gender issues in water Resources Management (Mr. Haule)
- (iv) Entrepreneurship in WRM (Mr. Liheta)
- (v) Financial Management in WRM (Mr. Liheta)
- (vi) IWRM contribution to poverty reduction (Mr. Mwaruvanda)
- (vii) Conflict Management (Mr. Liheta)
- (viii) Climate Change and adaptation measures in WRM (Mr. Mwaruvanda)
- (ix) Water as a Resource (Mr. Mwaruvanda)
- (x) Water governance (Mr. Mwaruvanda)
- (xi) IWRM concept and principles (Mr. Mwaruvanda)
- (xii) Management Instruments and tools in IWRM (Mr. Mwaruvanda)
- (xiii) IWRM Planning (Mr. Mwaruvanda)

3.3 Workshop working guidelines

For a fruitful workshop the following were agreed

- (i) Experts would work individually and make presentations starting at 10:30 every day. Comments and guidance would then be given for every topic presented.

- (ii) In preparing the proposed modules experts should state the overall objective, specific objective, training contents or learning points, training methodology and tools for evaluation of the lesson
- (iii) Development of specific objectives should revolve around development of Knowledge, skills and attitudes
- (iv) Being so broad, IWRM as a topic was proposed to be broken down into smaller more relevant topics for beginners. The proposed topics were
 - *Water as a resource*
 - *Water governance*
 - *IWRM concept and principles*
 - *Management instruments and tools in IWRM*
 - *IWRM planning*
- (v) Modules should be prepared in English and would later be translated into Kiswahili
- (vi) All key terms such as gender, entrepreneurship, governance should be clearly defined at the beginning of the module
- (vii) Each module shall finally be covered in five to eight pages
- (viii) Youth group should be clearly targeted in all training modules
- (ix) Each expert should prepare and strive to come up with a zero draft by the end of the workshop

3.4 Workshop deliverables

After five days of hard work experts managed to come up with outlines and few zero drafts for all proposed topics. It was however felt that, improvements and polishing would be needed before coming up with a draft report for sharing with PBWO/IUCN/ SNV associates. Many valuable comments on our draft report were received from PBWO/IUCN/ SNV. We have tried our best to incorporate them in our final report. One of the key comments was to have three separate manuals namely (i) IWRM (ii) Participatory Planning, stakeholder Participation and gender mainstreaming (iii) and Entrepreneurship and Financial Management. We have done as such. In this report the three “proposed manuals” are presented as three separate modules (see Annexure III,IV,V) each one containing its related topics.

4.0 Conclusions

The wrap meeting was attended by members of the Core team, IUCN RBM Manager and the three experts. The main objective was to jointly evaluate the one week programme and chart the way forward. The following conclusions were reached

- (i) The meeting was satisfied that the one week programme achieved its objectives despite being so tight on the part of experts. The one week experience left no doubts that more resources and time would be needed to develop relevant and appropriate training materials thus requiring adjustments on the previous timetable. A new programme to be followed was thus developed (see Annex I).

- (ii) Future implementation of all planned activities calls for flexibility bearing in mind that community engagement activities are highly iterative.
- (iii) Experts were dissatisfied by the slow administration of contractual requirements such as timely provision of allowances which left consultants wondering how they would meet their basic necessities. It was hoped this would be rectified in the future.
- (iv) A discussion on the disparities on the DSAs provided to experts as well as a change of fees from 150USD to as low as 100 USD was found to be a demotivating factor for the much desired team work. It was concluded experts would be paid 150 USD and DSA of 80,000 Tshs.
- (v) A programme report with draft training modules would be submitted to PBWO/ IUCN/SNV for review and feedback. It was also proposed a joint review of the modules might be appropriate.
- (vi) Experts proposed training should be run in two phases covering the theoretical part in the class followed by a field work lasting a minimum of 5 days to enable trainees practice, internalize issues learnt in the class as well as experience community facilitation skills on the ground. The earlier planned backup from facilitators would be determined after evaluation of the training

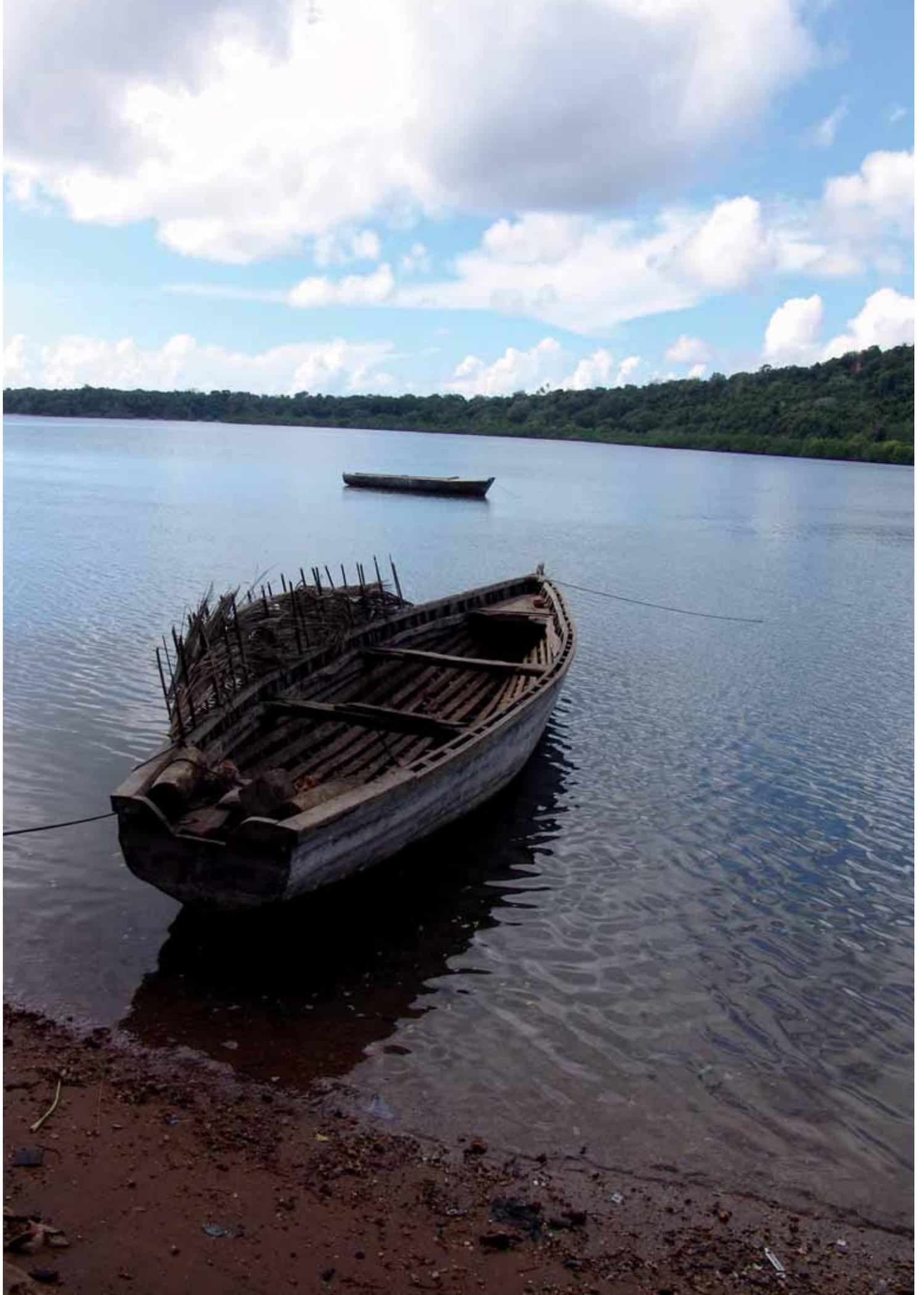


ANNEXURE I

Revised schedule for ToT Assignment

REVISED WORK SCHEDULE FOR ASSIGNMENT

S/N	Activity	Responsible	Time Schedule
1	Nomination of Expert	Core Team/Partners	2-3 March, 09
2	Send ToR to, and agree with Expert	Core Team	23-27 March, 09
3	Send training Module to expert for review	Core Team/Expert	25-30 March, 09
4	Development of training Materials (in Moshi)	Expert	06-10 April, 09
5	Draft training materials Report submission to IUCN	Experts	20-21 April, 09
6	Feedbacks from IUCN	IUCN and Partners	22 – 24, April, 09
7	Improvement of training materials and development of training activity guidelines, after receiving feedbacks from IUCN (5 days needed)	Experts	27 April to 1 st May, 09
8	Training of Facilitation Team (in Moshi/Arusha)	Expert + CT + PMU	25 May – 6 th June 09
9.	Translation of training materials by experts/facilitation Team	To be discussed in the partners meeting	
10.	Guiding the facilitation Team to train the Community	Expert/Core and Facilitation Teams	Backstopping to be determined
11.	Submission of final training report	Experts	17 th June, 2009 (7 working days)



ANNEXURE II

Duties and Responsibilities of Experts

Duties and responsibilities for the Community participation expert

The expert will undertake the following specific tasks using consultative and participatory approaches and methods:

1. Develop the training material to be used for the ToT. The training material should include but not limited to: community participation strategies/mechanisms within IWRM framework; stakeholder analysis principle (influence and power relations); gender mainstreaming in IWRM in relation to roles, rights and responsibilities among others;
2. Use the training material for the ToT;
3. During the ToT ensure that the ToT participants develop the training material and programme for community training;
4. Follow -up to ensure that the ToT participants carry out the community training as per the training programme developed during the ToT;
5. Implement the monitoring and evaluation (M&E) for the ToT and ensure that a similar M&E system is developed and implemented for the community training;
6. Submit the report on the ToT as well as the community training.

Duties and responsibilities for the IWRM Expert

The expert will undertake the following specific tasks using consultative and participatory approaches and methods:

1. Develop the training material to be used for the ToT. The training material should include but not limited to: introduction to IWRM key issues and Dublin principles and benefits in implementing IWRM; WRM approaches at river basin scale with emphasizes on Institutional arrangements for performing the function; water allocation issues with an emphasis on water permits procedures under existing policies, laws and registrations; pollution control and management at water sources and needs for monitoring systems; water resources planning at basin and subcatchment level, in holistic and participatory way, considering up/down stream water users relationships; approaches to conflict management by analyzing possible/existing conflict at local scale, and using IWRM approaches, discuss methods of negotiation; basic issues on climate change and its effects to water resources availability at river basin scale; impacts of climate changes on water resources and livelihood, climate variability and climate change adaptation measures during planning and allocation of water resources at local, basin and sub-catchment level;

2. Use the training material for the ToT;
3. During the ToT ensure that the ToT participants develop the training material and programme for community training;
4. Follow -up to ensure that the ToT participants carry out the community training as per the training programme developed during the ToT;
5. Implement the monitoring and evaluation (M&E) for the ToT and ensure that a similar M&E system is developed and implemented for the community training;
6. Submit the report on the ToT as well as the community training

Duties and responsibilities for the Co-operative Expert

The expert will undertake the following specific tasks using consultative and participatory approaches and methods:

1. Develop the training material to be used for the ToT. The training material should include but not limited to: water user organizations and entrepreneurship principle; Cooperative principles in relation to water user entities and Water resources management; benefits of registering Water user association as an income generating organizations;
2. Use the training material for the ToT;
3. During the ToT ensure that the ToT participants develop the training material and programme for community training;
4. Follow-up to ensure that the ToT participants carry out the community training as per the training programme developed during the ToT;
5. Implement the monitoring and evaluation (M&E) for the ToT and ensure that a similar M&E system is developed and implemented for the community training;
6. Submit the report on the ToT as well as the community training.





Pangani River Basin Management Project

The Pangani River Basin Management Project is generating technical information and developing participatory forums to strengthen Integrated Water Resources Management in the Pangani Basin, including mainstreaming climate change, to support the equitable provision and wise governance of freshwater for livelihoods and environment for current and future generations.

The Pangani Basin Water Board is implementing the project with technical assistance from IUCN (International Union for Conservation of Nature), the Netherlands Development Organization (SNV) and the local NGO PAMOJA. The project is financially supported by the IUCN Water & Nature Initiative, the Government of Tanzania, the European Commission through a grant from the EU-ACP Water Facility, and the Global Environment Facility through UNDP.

Pangani Basin Water Board

The Pangani Basin Water Board was established in 1991 and is one of 9 basin water boards in Tanzania. The PBWB has a number of roles and responsibilities including: data collection, processing and analysis for water resource management monitoring and resource assessment; technical aspects of trans-boundary issues in the basin; co-ordinate and approve basin WRM planning / budgets; approve, issue and revoke water use and discharge permits; enforce water use permits and pollution control measures; co-operate between sectors at the local level; and resolve conflicts and co-ordinate stakeholders.