



**REPUBLIC OF KENYA
MINISTRY OF WATER AND IRRIGATION**

**CONSULTANCY SERVICES FOR THE DEVELOPMENT OF IWUA TRAINING
MODULES FOR LOWER NZOIA IRRIGATION DEVELOPMENT PROJECT**

TRAINING MODULES

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LOWER NZOIA IRRIGATION PROJECT (LNIP) PHASE 1

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BOARD**

COUNTRY: KENYA

**PROJECT: KENYA WATER SECURITY AND CLIMATE RESILIENCE PROJECT
– PHASE 1**

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PREPARED BY:

DR. DAN ADINO-LEAD SOCIAL DEVELOPMENT EXPERT

MISS. NYAWIRA GITHINJI-IWUA SPECIALIST

MR. PATRICK OLIMBA- FINANCE SPECIALIST

ENG. EDWINE MANYONGE-IRRIGATION SPECIALIST

MARGARET MSAKU –AGRONOMIST

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Abbreviations

Ha	Hectare
IC	Irrigation Cooperative
IMT	Irrigation Management Transfer
IR&R	Internal Rules & Regulations
ISC	Implementation Support Consultant
ISF	Irrigation Service Fee
IWUA	Irrigation Water Users' Association
MoW&I	Ministry of Water and Irrigation
MOM	Management, Operation and Maintenance
NIB	National Irrigation Board
NGO	Non-Governmental Organisation
O&M	Operation and Maintenance
PIU	Project Implementation Unit
PMU	Project Management Unit
SPIU	Scheme Project Implementation Unit
WUA	Water Users' Association
WUG	Water Users' Group
WUO	Water Users' Organisation

SUMMARY

The Lower Nzoia Irrigation Project (LNIP) and the Nzoia Flood Protection Structures (NFPS) are approved investments under the Kenya Water Security and Climate Resilience Project – Phase I (KWSCRPI) and are two components of the Lower Nzoia Project (LNP) in Siaya and Busia Counties in Western Kenya. The World Bank, KfW and Government of Kenya jointly financed LNIDP component, in addition, World Bank and Government of Kenya financed the NFPS component. The Lower Nzoia Irrigation Development Project is a large-scale irrigation project located in Western Kenya in the counties of Busia and Siaya. The project area extends on both banks of the River Nzoia from the Old Nzoia Bridge downstream to the shores of Lake Victoria. The River Nzoia, which is the principal water source of the proposed scheme, is a tributary to Lake Victoria and the Nile Basin with a length of 312 km. The average annual discharge of the river is 146 m³/s, with peaks in May and August and the lowest flow in March. Water quality in the River Nzoia is suitable for irrigation purposes, although there are reports of high sediment loads during the rainy season. The major part of the Lower Nzoia River Basin area forms the river floodplain, which is where the proposed irrigation development is located. The project area characterizes extensive flooding during the rainy season, especially in the lower western and southern parts of the basin.

The project has three components as outlined below;

- 1) Infrastructure development of Intake, head works canal, main canal, secondary canals and tertiary canals as well as rehabilitation and improvement of existing Southern and Northern dykes. NIB is in charge of the project implementation Contractor and with the support of the Implementation support consultants (ISC).
- 2) Support to Agriculture Development, which includes crop production, extension, services, post - harvest handling, value addition and marketing. The production department of NIB supported by several ISCs and KALRO carries this out.
- 3) Support to the efficient operation of the scheme as well as progressively transferring the responsibilities and decision making from NIB to farmers organized in Irrigation Waters Users Associations (IWUAs). The NIB, social development department is implementing component three supported by Social Scientist from ISC.

The project adopts the Participatory Irrigation Management (PIM) approach in order to achieve project ownership by project beneficiaries and attain sustainability. The LNIDP conceptualizes a

community irrigation project owned and managed by the farmers guided by the PIM approach. Accordingly, recommendations and options for setting up farmers' institutions /IWUAs have been proposed and maintained under the project implementation. PIM approach promotes the involvement of irrigation users in all the aspects and levels of irrigation management to make it more sustainable and better focused on alleviating poverty as proposed in the LNIDP. Under the PIM, the farmers' take over the management of the LNIP from the implementing agency and in this case the National Irrigation Board (NIB). Develop and strengthen farmers' capacities to prepare for gradual and systematic taking over of the operation and maintenance (O&M) responsibilities after the completion of the construction phase. During the project construction stage and with the backup from Implementation Support Consultant (ISC), NIB provides capacity building of IWUAs to facilitate the Irrigation Management Transfer (IMT) process.

Ultimately, the farmers are progressively and systematically prepared through a process of Irrigation Management Transfer (IMT). IMT is a program of transferring the management of an irrigation system from government to local user groups. Under the IMT, some irrigation functions that NIB and other irrigation agencies performed gradually and systematically transfer to the beneficiaries to enable the agencies to concentrate on their core functions of providing irrigation infrastructure and technical support to the subsector.

Under the LNIDP, the Project Implementation Unit (PIU) and Scheme Project Implementation Unit (SPIU) will conduct the PIM and IMT with support from the Implementation Support Consultant (ISC). To implement these responsibilities, male and female farmers will get training and capacity development. Male and female farmers will be organized, elect leaders and develop by laws to govern water management. Explained below are the planned phases towards achievement of farmers' organization and management;

- **Pre-construction of Irrigation scheme phase:** Farmers mobilization and sensitization, Formation of Water Users Groups (WUG) at feeder canal level, Block Irrigation Water Users Associations (IWUA) at tertiary canal level, and of an Apex IWUA at scheme level. This is ongoing with the team already sensitizing the farmers, holding elections of the WUG and IWUA leaderships, developing by laws and registration of the block IWUA with the County Social Development Office.
- **Construction of Irrigation scheme phase:** the focus in this phase is on institutional development and capacity building for the IWUAs.
- **Operational of Irrigation scheme phase (years 1-5):** during operational phase, the WUGs should handle O&M at the feeder and tertiary levels while the Block IWUAs shall collect water charges and remit to the Apex IWUA. The Apex IWUAs scheme management committees are responsible for determining the cropping patterns, crop water requirements and the water distribution programme, and on the O&M budget and level of service charge.
- **Operational of Irrigation scheme phase (year 6 onwards):** IWUAs are responsible for O&M of the secondary canals.
- **Mature of Irrigation scheme (IMT) phase:** in the maturity phase, the Apex IWUA assumes responsibility for the entire scheme, with infrastructure transferred on a lease arrangement. The PIU is scaled down into a Scheme Management Support Team (SMST) to manage the head-works and primary canal under an agreement with the Apex IWUA.

1.0 MODULE I: COMMUNITY MOBILIZATION AND IWUA FORMATION

GENERAL OBJECTIVE OF THE LESSON

At the end of this lesson, the participants are expected to be equipped with knowledge and skills necessary for effective participation and enhancement of their organization to develop and manage their irrigation project sustainably

SPECIFIC OBJECTIVES OF THE LESSON

By the end of the session, participants will be able to

1. Understand irrigation development
2. Describe Group dynamics and community mobilization
3. Explain IWUA formation process, roles and functions
4. Explain the IWUA by laws and formulation
5. Describe Stakeholder analysis
6. Outline Legal requirements

MAIN CONTENT OF THE LESSON (SUBJECT MATTER)

1. Irrigation development
2. Group dynamics and community mobilisation
3. IWUA formation process, roles and functions
4. IWUA by laws and formulation
5. Stakeholder analysis
6. Legal requirements

LESSON PLAN (SESSION FLOW)

The [session flow](#) should preferably be in following order:

1. Irrigation development
2. Group dynamics and community mobilisation
3. IWUA formation process, roles and functions
4. IWUA by laws and formulation
5. Stakeholder analysis
6. Legal requirements

Training Methodology

Lectures

Group discussions

Role plays

Participants (Target Audience) No. 30-50

Farmers

Community Leaders

RESOURCE MATERIAL

Time when to conduct the training

At the beginning of project initiation

Training Materials

Flip charts, Posters

1.1 Session 1: Irrigation Development

Specific Objectives

To be aware of what irrigation development entails and the scope of their project

Session Objectives: At the end of this session the participants should be able to

- i. Define irrigation development
- ii. Explain what irrigation development entails
- iii. Enumerate the various components of irrigation development including: Intake, conveyance and application

Session Flow

- i. Introduction **to** Irrigation development
- ii. What irrigation development entails
- iii. Components of irrigation development

Training Methodology

The training will be conducted through participative/interactive lectures, , group discussions and role plays

Participants (Target Audience) No. 30-50

Farmers

Community Leaders

Time when to conduct the training

At the beginning of project initiation

Training Materials

Flip charts, Posters, note books

Session Duration

Two hours

Irrigation Development

The process of adding improvements to a parcel of land, such as grading, subdivisions, drainage, access, roads, utilities to facilitate agricultural production through irrigation.

Irrigation Development Phases:

Like any other project, the Irrigation Development process is cyclic and therefore follows the familiar stages of development i.e.:

- Project idea/Identification/Planning
- Implementation
- Monitoring
- Evaluation
- Termination/ Operation and Maintenance

NB/: All stakeholders especially farmers must feel part and parcel of the cycle and play their part for project success.

a) Identification/Planning.

Need to identify the objectives to accomplish, actions to be taken and by who.

Planning for irrigation development involves a number of activities:

- Project idea generation- Must be a felt need by the community
- Opinion leaders liaise and sell the idea to relevant stakeholders
- Consultations/ meetings at various levels to concretize the idea
- Pre-feasibility and detailed feasibility studies
- Statutory requirements/ MOUs

b) Implementation.

- Translating the project into tangible activities on the ground includes:
 - Trainings
 - Constructions
 - Supervisions

NB: All stakeholders should play their rightful roles as in MOUs

C) Monitoring and Evaluation.

- Monitoring-Tracking the progress and adjusting plans according to the information collected so as to meet set objectives
- Evaluation- Assessing the outcomes of an on-going or a completed project to inform the future course of the project and draw lessons for other projects
- The beneficiaries need to take an active role in M&E

d) Termination

- Handing over after completion of the construction of the Infrastructure.
- This is the beginning of serious O&M phase and production activities.
- Smooth transition in this phase ensures continued enjoyment of project benefits in a sustainable way
- Must plan ahead for O&M especially related budgets
- This ensures that funds are available in time so that the system is operated and maintained as envisaged in the design
- Emphasis should be on preventive maintenance

e) Components of Irrigation Development Infrastructure.

Abstraction: This is the point which water is obtained from a stream, a borehole, dam etc. The Abstraction can be through use of gravity as driving force for the transport of water or pumping using centrifugal pumps, submersible borehole pumps etc. Some of the common water abstraction infrastructures typical to irrigations schemes include:

- Weirs.
- Pumps and pump stations.
- Dams.
- Diversion channels etc.

Conveyance system: This is the infrastructure used to transport water from the abstraction point to the fields. This could be in the form of:

- Open Canals: Earth or Concrete lined.
- Closed Conduits: Pipes, Culverts

1.2 Session 2: Group Dynamics and Community Mobilization

Specific Objectives To understand the group dynamics and community mobilization. At the end of this session, the participants should be able to

1. Define community mobilization and ways to mobilize communities
2. Define a group and explain group dynamics
3. Explain the importance of group
4. Enumerate the stages of group development and explain factors that hold the group together

Session Flow

1. Community mobilization and ways to mobilize communities
2. Groups and group dynamics
3. Importance of groups
4. Enumerate the stages of group development and explain factors that hold the group together

Training Methodology

The training will be conducted through participative/interactive lectures, Lectures, Group discussions and Role plays

Participants (Target Audience) No. 30-50

Farmers

Community Leaders

Time when to conduct the training

At the beginning of project initiation

Training Materials

Flip charts, Posters, note books

Session Duration

Two hours

What is a Community?

A community is a group of people, based on common beliefs, values and norms, who live within a geographically defined area (territory) and who share a common language, culture or values. In short, a community refers to an area or a village with families who are dependent on one another in their day-to-day transactions, thereby creating mutual advantages.

Group Activity: 1 Write about your community.

Name of our village _____

Language we speak _____

Festivals we celebrate _____

Religions _____

Beliefs and values _____

Villages surrounding our area _____

Occupations _____

Issues _____

Concept of Community Mobilization

Group Activity: 2 State some of the different reasons for mobilizing our

Community: _____

To mobilize is to get something or someone on the move. It follows then that community mobilization is about organizing the community and all the resources available in the community to move them towards achieving a certain program goal, such as irrigation development. Having this concept in mind, **community mobilization** is *defined* as a capacity building process, through which individuals, groups and families (such as model families), as well as organizations, plan, carry out and evaluate activities on a participatory and sustained basis to achieve an agreed goal. This might be from their own initiative — or a goal stimulated by others.

Community mobilization engages all sectors of the population in a community wide effort to address a social, environmental, health or irrigation development issue. It brings together policy makers and opinion leaders, local, national, and county governments, professional groups, religious groups, businesses, and individual community members. **Community mobilization** empowers individuals and groups to take some kind of action to facilitate change.

To mobilize a community around any issue or problem, such as the **Irrigation infrastructural development**, is to raise the community’s consciousness about that issue through education, support the community to think about how the issue affects them, and to nurture the will and commitment of community members develop constructive responses.

The **Community Mobilization** activities for the Project such as Lower Nzoia Irrigation Development Project (LNIDP) aim to:

1. Create awareness about and an open dialogue around irrigation development in communities of Lower Nzoia
2. Enhance the communities’ understanding of, participation in, and enthusiasm for irrigation
3. Foster understanding and acceptance of irrigation among the community members
4. Promote community participation /support in all the project activities.

Do’s and Don’ts of Community Mobilisation

	Don’ts	Do’s
1	Do it all for the community	Do it with the community help
2	See professionals as the experts	Use community expertise

3	Deny ethnic and cultural differences of a Community	Understand ethnic and cultural differences of communities and build on ethnic and cultural diversities
4	Plan mobilization efforts alone	Include others in the planning process
5	Focus solely on individual efforts	Develop community partnerships

Steps in Community Mobilization

Typically, community mobilization will involve a series of community meetings to:

1. Create awareness of the project such irrigation infrastructural development and related issues
2. Motivate the community through community preparation, organizational development, capacity developments and bringing allies together
3. Share information and communication
4. Support them, provide incentives and generate resources.

There are many tools and techniques for collecting information that will help to know more about the community. Some examples include:

- Direct observation
- Group interviews
- Sketching maps
- Workshops.

Techniques to involve a community

To work best with the community, one needs to identify the **right people** (opinion leaders) in the community who can explain their habits, customs, values, taboos and the rules of that community. These are sometimes called the **community norms**. It is important to also identify and cultivate good relations with influential the people/leaders who can introduce you to the community/project locality namely;

- Provincial administration leaders (DCCs, Chiefs, village elders,
- Community leaders
- religious leaders
- County government officers, in order to be accepted by the community.

As community mobilization progresses, everyone in the community needs to be informed about the planned/proposed project.

To be involved in the community, it is essential to develop the required or acceptable behaviour. It is crucial to be polite and persuasive. It calls for one being patient, a good listener, tolerant and self-restrained, honest, open, non-judgmental and respectful.

The three things one needs to work on at the beginning of community mobilisation activities.

1. Get the support of influential people in the community, including those who are called opinion leaders.
2. Be sure that all the people of the community are informed about the irrigation development issues the project aims to address.
3. Behave in an open and honest way, and try to act as a role model in the community.

Advantages of community mobilization

Proper management of resources is the best possible way for the development of the community. In other words, community mobilization is where people participate in planning and all project activities. The process empowers communities to take charge, transforming their community and their lives.

Community mobilization allows people in the community to:

- i. Identify needs and promote community interests.
- ii. Promote good leadership and democratic decision making.
- iii. Identify specific groups for undertaking specific roles.
- iv. Identify all the available resources in the community.
- v. Plan the best use of the available resources.
- vi. Enables the community to better govern itself, thereby achieving sustainability.

What a group is

A **group** is:

A collection of people who interact with one another, accept rights and obligations as members and who share a common identity and are connected to one another by social relationships.

Listed below are some attributes of groups:

- A set of people who engage in frequent interactions
- They identify with one another.
- Others define them as a group.
- They share beliefs, values, and norms about areas of common interest.
- They define themselves as a group.
- They come together to work on common tasks and for agreed purposes

This shows that groups are **intended** and **animate**. They are not some random experience and as a result, they have three crucial characteristics:

- They are parts
- There is relationship between the parts
- There is an organizing principle

Steps in-group formation

The most influential model of the group developmental process in terms of its impact upon texts aimed at practitioners - has been that of Bruce W. Tuckman (1965). While there are various differences concerning the number of stages and their names - many have adopted a version of **Tuckman's model**, which has **forming, storming, norming and performing**.

1. **Forming**: The group comes together and gets to initially know one other and form as a group. Members identify the boundaries of both interpersonal and task behaviors.
2. **Storming**: A chaotic vying for leadership and trialing(testing) of group processes
3. **Norming**: Eventually agreement is reached on how the group operates (norming)
4. **Performing**: The group practices its craft and becomes effective in meeting its objectives.

Tuckman added a 5th stage 10 years later:

5. **Adjourning** the process of "informing" the group, that is, letting go of the group structure and moving on.

Group function and group dynamics

The key forces affecting upon group processes and dynamics include:

- ◆ Group interaction
- ◆ Group interdependence
- ◆ Group structure
- ◆ Group goals
- ◆ Group cohesion

Group interaction- the way in which people engage with and influence each other - from contrasting perspectives

- **Task interaction** can be seen as including 'all group behaviour that is focussed principally on the group's work, projects, plans and goals
- **Relationship interaction** is centred on the social and interpersonal aspects of group life.

Group interdependence

This is a basic feature of groups that group members' outcomes often depend not only on their own actions, but also on the actions of others in the group. One member's **feelings, experiences** and **actions** can come to be influenced in whole or in part by others.

i. Group Structure

Group structure defines norms, roles and stable patterns of relationship among the members of the group'.

ii. Group size

Consideration for the group size is crucial. Large groups function differently in a number of important respects to smaller groups. Size impacts on group communication. In smaller groups a higher proportion of people are likely to participate – there is potential more time for each, and the smaller number of people involved means that speaking may not be as anxiety-making as in a large group.

1. Group norms.

- Norms are basically rules of conduct that indicate what attitudes and behaviour might be expected or demanded in particular social situations and contexts.
- They are shared expectations of behaviour that set up what is desirable and appropriate in a particular setting or group.
- Socially established 'and shared beliefs regarding what is normal, correct, true, moral and good generally have powerful effects on the thoughts and actions of group members. Group norms develop in groups often because they are necessary for the group to survive and/or to achieve its ends.

2. **Roles.**

- The package of expectations and attributes linked to a social position can be seen as a role. In groups, people expect certain behaviour from those they see as the leaders.
- Different people play different roles – sometimes these are assigned (such as the in the membership of committees), sometimes they emerge through interaction.
- Roles define the formal structure of the group and differentiate one position from another. Different social roles are often linked to different degrees of status and power within the group.

3. **Group goals**

- An obvious, but sometimes overlooked, factor in group processes and dynamics is the reason why the group exists.
- What does it do for its members?
- What is its object?
- How was it created?
- The form that a group takes is often heavily dependent on its **purpose (goal)**.
- Group goals are ideals – they are the ends (the aims or the outcomes) sought by the group and its members.
- Without some commitment to the pursuit of common goals the group will not survive

4. **Group cohesion**

- Groups are unified social entities.
- The notion of group cohesion – the forces or bonds that bind individuals to the collectivity - is fundamental to an appreciation of groups.

- The power of the bonds in groups, the feelings that group members have for each other and the extent to which they are prepared to cooperate influences ability to achieve their goals.

1.3 Session three : IWUA formation roles and functions

Specific Objectives

To understand the IWUA formation process (By laws and constitution)

Session Objectives

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

- i. Define the IWUA and enumerate the objectives of an IWUA
- ii. Explain the processes of IWUA formation
- iii. Discuss roles and functions of IWUA
- iv. Discuss the organizational structure of an ideal IWUA

Session Flow

- i. IWUA concept definition
- ii. Processes of IWUA formation
- iii. Roles and functions of IWUA
- iv. Organizational structure of an ideal IWUA

Training Methodology

The training will be conducted through participative/interactive lectures, , group discussions and role plays

Participants (Target Audience) No. 30-50

Farmers

Community Leaders

Time when to conduct the training

At the beginning of project initiation

Training Materials

Flip charts, Posters, note books

Session Duration

Two hours

Objectives of Irrigation Water User Associations (IWUA)

The main objective of Irrigation Water Users Associations is management of a canal network, wholly or in part, in order to provide water to its members for agricultural purposes.

The other specific objectives of IWUA are:

- Coordinate the participation and involvement of the beneficiary communities for equitable irrigation water distribution among the farmers on outlet command basis
- Process and carryout resource mobilization (irrigation O & M fee, labour contribution, etc)
- Resolve disputes and conflicts among the beneficiaries that may arise due to improper water utilization.
- Provide support and assistance in the form of labour, cash and construction materials during scheme construction.
- Prepare operations and maintenance plans and ensure their implementation.
- Facilitate irrigation extension, drainage and pollution control work in the service area or canal network.
- Enlist members and update the list of water user farmers.
- Maintain records
- Propose changes in scheme during planning and construction.
- Prepare and execute irrigation management plans.

Establishments of Irrigation Water User Associations (IWUAs)

What is an IWUA

Irrigation Water Users Association (IWUA) is a group of farmers that are organised at the level of a secondary canal. It can be described as a group of farmers who provide a service of irrigation water to their members who pay for this service (irrigation service fee) in a shared service area well demarcated by operation hydraulic boundaries (blocks/units). IWUAs are self-managed organizations governed by their members, but due to the public interest of the invests in the irrigation systems, their tasks are subject to some form of supervision by the government/or agencies mandated by the government

IWUA development approach is sub-divided in the 3 phases namely:

Awareness and Formation Phase

The main purpose of the Awareness Campaign is to inform the concerned farmers/landholders in the command area of the scheme/project about the following:

- i. Rationale of establishing IWUAs at the level of main and secondary canals

- ii. Transfer of responsibility for Operation & Maintenance(O&M) of scheme/project to farmers
- iii. Farmers' responsibility to finance all costs related to O&M of the entire scheme;
- iv. Expected benefits of having IWUAs.

Capacity development Phase

Farmers through their IWUA can only successfully take over the responsibility for the O&M of their scheme/project if the members of the Management Committee, including the office bearers, and any sub committees of the IWUA as well as any permanent and temporary staff employed by the IWUA have the necessary knowledge and skills. These to carry out their roles and responsibilities properly. Therefore, it is paramount for the effective and sustainable O&M of the scheme/project that a **comprehensive capacity development programme** for each IWUA is prepared and implemented

Irrigation Management Phase

A comprehensive training and support programme must be implemented by implementing agency to ensure that the IWUAs and IWUA will have the necessary technical knowledge and skills for the effective O&M of the irrigation, drainage and canal-related facilities located within the command area of the scheme.

Rationale for IWUA formation

- i. IWUAs are established provide irrigation water to a large number of people and community and they often times the use public irrigation infrastructures, i.e. infrastructures built with public money and owned **by the government**.
- ii. The tasks of IWUAs are strictly limited to governance, operation, maintenance and management of an irrigation and drainage system.
- iii. IWUAs operate within a **precisely delineated service area**. It comprises a distinct hydraulic unit such as the command area of an irrigation system, part of the command area (secondary or tertiary unit) of a large irrigation scheme.

Key activities in IWUA establishment

- Community/farmer mobilization for formation and training of Interim Committee
- Preparation of draft bylaws, service area plan, application for establishment of IWUA, (Social Services/or any other relevant authority) and list with potential IWUA members

- Interim Committee meeting, including provision of Orientation /Study tour
- Formation of provisional Management Committee
- Registration of IWUA
- Management Committee meeting to elect office bearers
- Registration of IWUA members and collection of membership fee
- Opening of bank account in name of IWUA

Roles and related tasks of IWUAs

- The IWUA tasks are all related to operation and maintenance of the irrigation and drainage system located within its service area.
- IWUAs cannot engage in any other activity such as marketing products or the provision of agricultural inputs.

Roles and related tasks of IWUAs can be sorted into three categories:

- i. Governance,
- ii. Operation and maintenance
- iii. Management:

1. Governance (or social management): This role relates to the role and responsibilities of the General Assembly: election of members of governing bodies, action planning, and preparing reports, and adoption and amendment of regulations that govern day to day activities of an IWUA. Examples of operational rules include rules related to water distribution, maintenance of irrigation infrastructures, type and level of sanctions for violation of the rules, and defaults of payment of the irrigation service fee.

2. Operation and maintenance (O&M): This role includes all activities that deal with planning, implementation and monitoring of water distribution and maintenance works, and training IWUA members in irrigation techniques and/or water saving methods.

3. Management: This role relates to the administration of the IWUA and the financial management.

IWUA activities

Governance or (Social management)

1. Set up the objectives of the IWUA taking into account members needs and interests (or Social
2. Formulate strategies to reach the IWUA's objectives
3. Set and/or modify internal regulations
4. Preparation/amendment of IWUA by-laws
5. Elect the members of the General assembly and the governing bodies
6. Approve annual/seasonal action plan and corresponding budget
7. Approve annual/seasonal financial and activities report
8. Internal audit of the IWUA finance
9. Resolve conflicts among IWUA and its members
10. Arbitrate conflicts among IWUA members
11. Approve contracts with external service providers
12. Approve change of the IWUA service area
13. Approve the reorganization or dissolution of the IWUA

Operation & maintenance

1. Regular inspection of irrigation infrastructure and equipment (i.e. Pumps)
2. Prepare the annual/seasonal action plan for maintenance of infrastructures and equipment's
3. Make sure that building material and spare parts for maintenance activities are available
4. Carry out routine, seasonal and emergency maintenance works
5. Monitor maintenance activities
6. If need be, monitor modernization or rehabilitation works and replacement of worn out equipment
7. Prepare an annual/seasonal plan for water distribution
8. Monitor the implementation of the annual/seasonal water distribution plan
9. Measure and monitor irrigation water use
10. Prevent any unauthorised use and wastage of water;
11. Prepare annual/seasonal activities report
12. Adopt and use indicators for monitoring O&M
13. Identify and mitigate the risk of damage to irrigation infrastructures and equipment
14. Identify and mitigate the risk of soil erosion, soil salinity
15. Train member in irrigation techniques

Management

1. Enforce IWUA by-laws and operational rules
2. Prepare annual/seasonal budget including the amount of the irrigation fee
3. Book keeping (accounting)
4. Make regular inventory and manage stocks of building material, machinery and spare parts, fuel
5. Recover irrigation fees and apply sanction for non or late payment
6. Prepare annual/seasonal financial reports
7. Hire, supervise and pay IWUA employees (e.g technicians)
8. Pass and monitor contracts with external service providers
9. Implement the communication procedures within the IWUA
10. Keep IWUA archives
11. Any other activities assigned by the General Assembly or the Management Committee

IWUA Structure and IWUA Governance

Members of an IWUA

a. Conditions for membership

Membership in the IWUA is mandatory for every person with the land use right within the “service area” of an IWUA (i.e. the land capable of being supplied with irrigation water from the irrigation system operated by the WUA). The membership obligation is not personal to the farmer as such; rather it is linked to the land which he/she has use rights.

Compulsory membership is essential to ensure IWUA sustainability. This prevents non-members who receive surface irrigation water in the service area from free-riding. It prevents people from benefiting from irrigation water without contributing to costs of the operation and maintenance and other investments in the irrigation infrastructure and management.

b. Rights and duties of members

The basic rights of IWUA members are the right to:

- a) *“Fair” share of irrigation water.* This is, of course, the most important practical right for an IWUA member.
- b) *Benefit from services provided by or through the IWUA* such as training and capacity building activities
- c) *Vote in elections for IWUA officials.* This is clearly a key right without which the democratic functioning of a IWUA could not take place.
- d) *Stand for executive office and committee positions in the IWUA* (provided no outstanding fees are owed to the IWUA)

- e) *Propose matters for discussion at meetings of the general assembly.* This right is important to ensure that the General Assembly can provide a genuine forum for IWUA members to raise matters of concern to them rather than to act as a “rubber stamp” that merely agree with everything the executive of the IWUA suggest.
- f) *Inspect the books and records of the IWUA.* This right is particularly important in terms of promoting transparency within an IWUA and ensuring accountability on financial

The **basic duties of IWUA members** are to:

- i. ***Comply with the provisions of the by-laws and internal rules of the IWUA including water distribution rules.*** The effect of this duty is to provide statutory backing (in other words the backing of formal law) to the internal rules of each IWUA.
- ii. ***Promptly pay the irrigation service fee*** and other related charges agreed upon by the IWUA membership. The need for this duty is to ensure the financial viability of the IWUA and the sustainability of the irrigation system it manages.
- iii. ***Allow access to land for the purpose of operation and maintenance of irrigation infrastructure.*** This duty is necessary to enable routine operation and maintenance works to take place.
- iv. ***Comply with the decisions of IWUA officials and staff.*** This duty is necessary for the smooth functioning of an IWUA.

c. Governing bodies of IWUAs

IWUAs are self-managed organizations and governed by their members through the General Assembly. In addition to the General Assembly, each IWUA has a Management Committee and the Dispute Resolution Committee is optional.

a. General Assembly

The General Assembly is the sovereign, or main decision making body of each IWUA. Key tasks in this respect are the election of the Management Committee, and the approval of the level of the irrigation service fee and annual operation and maintenance charges. The other tasks of the General Assembly include:

- Setting the annual budget for the IWUA including the level of fees and charges payable by members
- Approving an annual work-plan and watering plan or schedule
- Approving the annual report on the annual accounts of the IWUA prepared by the Management Committee
- Electing the executive officers and members of the committees of the IWUA
- Adopting binding operating rules necessary for the functioning of the IWUA (e.g. as to procedures for requesting, using and paying for water and operation and maintenance) and

- the level of fines payable if such rules are breached
- Amending the by-laws of the IWUA as needed

b. Management Committee

The Management Committee (5 – 12 persons) is elected by the General Assembly and is in charge of ensuring the smooth day to day operation of the IWUA according to decisions made by the General Assembly. The Management Committee is accountable to the General Assembly and its tasks are to:

- Supervise the functioning of the IWUA, to ensure that the decisions of the General Assembly are implemented
- Provide direction to the manager of the IWUA (where these exist)
- Ensure the implementation of the agreed budget and work-plan and to monitor the performance of the IWUA
- Prepare the agenda for, and convening the meetings of, the General Assembly
- Prepare the draft budget, work plan, annual report, internal regulations and other documents for approval by the General Assembly
- Ensure that the IWUAs financial and accounting procedures are followed
- Elect one of its members to be the chairperson of the IWUA
- Other tasks that may be determined by the General Assembly or specified in the by-laws

IWUA bylaws and internal regulations IWUA By laws

a. Importance of by-laws

Each IWUA must have its own Constitution and by-laws. A **Constitution** is defined as a body of fundamental **principles** or **established precedents** according to which a state or other organization is acknowledged to be governed.

By Laws refers to a law of limited or local application passed under the authority of a higher law specifying what things may be regulated. It can also refer to internal rules of an organisation

- The by-laws constitute the identity of the IWUA in terms of name and address, service area, its organization and functions *vis à vis* external actors.
- The by-laws are also the primary source of internal rules and regulations that regulate the IWUA's activities. In other words, the by-laws are the constitutional rules of each IWUA.
- Like the constitution of a country, by-laws should not be amended frequently in order to promote stability and should be amended only if strictly necessary

b. Purpose of by-laws

The founders of an IWUA do not have complete freedom in terms of the content of IWUA by-laws.

- The basic parameters are set by the IWUA Declaration with which the by-laws must comply.
- By-laws should never be used in a rigid, standard model applied to all IWUA.
- By-laws should reflect a IWUAs own particular requirements.

The minimum requirements of the by-laws of each IWUA to comply with the Declaration include:

- a. Name and address of the IWUA
- b. Description of the service area by reference to plans or maps
- c. Vision, Mission and Objective(s) of the IWUA and its authorized tasks
- d. Structure and competences of governance bodies of the IWUA
- e. Right of each IWUA to adopt its own operating rules
- f. Rights and duties of members of the IWUA
- g. Procedures for the calling of meetings of governance bodies
- h. Provisions on the setting of fees
- i. Provisions on the modification of the by-laws, liquidation of the IWUA.

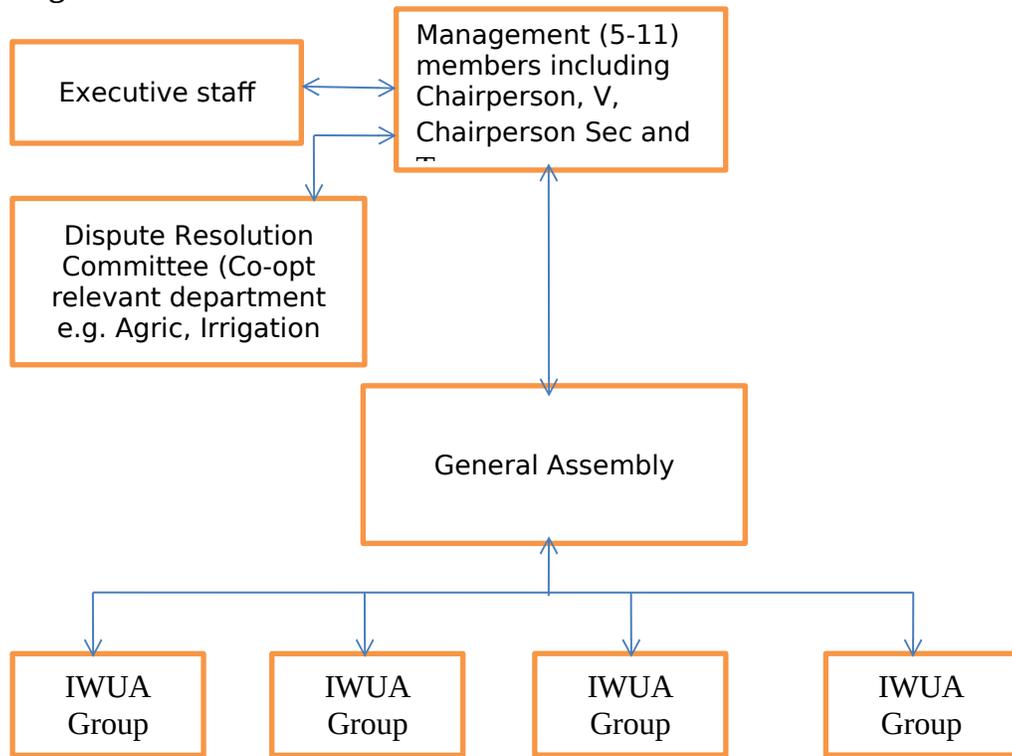
b. By-laws formulation procedure

- Sensitization workshop for members.
- Broad outline of content
- Draft by-laws
- Circulation of draft copies to members
- Deliberations on draft-workshop
- Incorporation of members' comments into the draft
- Deliberations on final draft
- Ratification of final draft (General assembly)

c. Operationalization of IWUA by-laws

- Circulation of copies to all members
- Circulation of copies to department of social services
- Circulation of copies to Provincial administration
- Circulation of copies to local judicial office
- Enforcement.

Irrigation Water Users Association



1.4 Session four : Stakeholder Analysis

Specific Objectives

To identify and understand the roles of relevant stakeholders

Session Objectives

At the end of this session the participants should be able to

- i. Define stakeholder
- ii. Identify the stakeholders
- iii. Discuss stakeholder categories and their roles in irrigation development

Session Flow

- i. Definition of a stakeholder
- ii. Stakeholders identification and analysis
- iii. Categories and their roles in irrigation development

Training Methodology

The training will be conducted through participative/interactive lectures, , group discussions and role plays

Participants (Target Audience) No. 30-50

Farmers

Community Leaders

Time when to conduct the training

At the beginning of project initiation

Training Materials

Flip charts, Posters, note books

Session Duration

Two hours

Definition of a stakeholder

i. Stakeholder Definition

A stakeholder can be defined as an **agency, organisation, group or individual** who are involved either directly or indirectly in the project/programme, and/or whose who are affected either positively or negatively by the implementation and outcome of it. In order for a Project to

succeed management and engagement of stakeholders is critical. It is necessary to determine how the stakeholders are likely to

- react to project decisions,
- what influence their reactions will carry
- How they might interact with each other, with the project staff and affect the chances for success of a project implementation.

ii. Stakeholder identification and analysis

Most development projects including Lower Nzoia Irrigation Development Project (LNIDP) involve multiple shareholders, and each one potentially has the ability to speed up, slow down or completely obstruct your progress. Stakeholders may not be in the driving seat, but they can be extremely useful advocates, sponsors and agents of change.

The most important reason for identifying and understanding stakeholders is that it allows you to recruit them as part of the effort. Community development experts emphasize that, a participatory effort that involves representation of as many stakeholders as possible has a number of important advantages:

- a. **It puts more ideas on the table** than would be the case if the development and implementation of the effort were confined to a single organization or to a small group of like-minded people.
- b. **It includes varied perspectives from all sectors and elements of the community affected**, thus giving a clearer picture of the community context and potential pitfalls and assets.
- c. **It gains buy-in and support for the effort from all stakeholders** by making them an integral part of its development, planning, implementation, and evaluation. It becomes their effort, and they'll do their best to make it work.
- d. **It's fair to everyone.** All stakeholders can have a say in the development of an effort that may seriously affect them.
- e. **It saves implementors from being blindsided by concerns they didn't know about.** If everyone has a seat at the table, concerns can be aired and resolved before they become

stumbling blocks. Even if they can't be resolved, they won't come as surprises that derail the effort just when you thought everything was going well.

- f. **It strengthens your position if there's opposition.** Having all stakeholders on board makes a huge difference in terms of political and moral clout.
- g. **It creates bridging social capital for the community.** Social capital is the web of acquaintances, friendships, family ties, favors, obligations, and other social currency that can be used to cement relationships and strengthen community. Bridging social capital, which creates connections among diverse groups that might not otherwise interact, is perhaps the most valuable kind. It makes possible a community without barriers of class or economics, where people from all walks of life can know and value one another. A participatory process, often including everyone.
- h. **It increases the credibility of your organization.** Involving and attending to the concerns of all stakeholders establishes your organization as fair, ethical, and transparent, and makes it more likely that others will work with you in other circumstances.
- i. **It increases the chances for the success of your effort.** For all of the above reasons, identifying stakeholders and responding to their concerns makes it far more likely that your effort will have both the community support it needs and the appropriate focus to be effective.

iii. Stakeholder Categories

The categories of stakeholders include

- **Primary stakeholders:** These are the beneficiaries or targets of the effort. They are the people or groups that stand to be directly affected, either positively or negatively, by an effort or the actions of an agency, institution, or organization. The farmers and beneficiaries are the primary stakeholders for LNIDP
- **Secondary stakeholders** are people or groups that are indirectly affected, either positively or negatively, by an effort or the actions of an agency, institution, or organization. A project such as LNIDP for instance, could have a positive effect other community groups or institutions. These groups would be secondary stakeholders.

- Ordinary community members whose lives, jobs, or routines might be affected by the project /initiative, such as the such as developing the infrastructure of LNIDP with the attendant changes of some families relocated and group support networks affected, presence of canals in the midst of homesteads ets .
 - Institutions such as schools and business people
- **Key stakeholders**, who might belong to either or neither of the first two groups, are those who can have a positive or negative effect on an effort, or who are important within or to an organization, agency, or institution engaged in an effort. The Donors such as World Bank and German government are obvious key stakeholder for a project such as LNIDP. Other examples of key stakeholders might be elected or appointed government officials both at national and county level, heads of businesses, or clergy and other community figures who wield a significant amount of influence.
- County government representatives, Governors Senators, Members of Parliament, Members of County Assemblies (MCAs)who introduce and pass laws and generally control public budgets and have great influence of their constituents. These people or groups often have no official power – they may be “advisers” to those with real power – but their opinions and ideas are often followed closely. If they’re on your side, that’s a big plus.
 - National/county government agencies. Government agencies often devise and issue regulations and reporting requirements, and can sometimes make or break an effort by how they choose to regulate and how vigorously they enforce their regulations.

When to identify stakeholders and their interests

Regardless of the purpose of your effort, identifying stakeholders and their interests should be among the first, if not the very first, of the items on your agenda. It’s generally the fairest course you can take, and the one that is most likely to keep your effort out of trouble

- LNIDP requires involvement of stakeholders in a participatory process, for obvious reasons. They should be part of every phase of the work, so that they can both contribute and take ownership. Their knowledge of the community and understanding of its needs is

invaluable in helping implementors avoid mistakes in approach and in the people chosen to be involved

Identifying Stakeholders

In identifying stakeholders, it's important to think beyond the obvious. Beneficiaries, policy makers, etc. are easy to identify, whereas indirect effects – and, as a result, secondary stakeholders – are sometimes harder to see. Introduction of a project like LNIDP will affect communities in the project area and introduce anew people in the locality. Try to think of as many ways as possible that your effort might bring benefits or problems to people not directly in its path.

Given that, there are a number of ways to identify stakeholders. Often, the use of more than one will yield the best results.

- **Brainstorm.** Get together with people in such as Project Implementation Team and other departments, already involved in or informed about the effort and start calling out categories and names. Part of the point of brainstorming is to come out with anything that comes to mind, in the process identifying primary, secondary, and/or key stakeholder.
- **Collect categories and names from informants in the community** (if they're not available to be part of a brainstorming session), particularly members of a population or residents of a geographic area of concern.
- **Consult with organizations** that either are or have been involved in similar efforts, or that work with the population or in the area of concern.
- **Get more ideas from stakeholders** as you identify them.

Discovering and Understanding Stakeholder Interests

Stakeholder interests may vary. Some stakeholders' interests may be best served by carrying the effort forward, others' by stopping or weakening it. Even among stakeholders from the same

group, there may be conflicting concerns. Some of the many ways that stakeholder interests may manifest themselves:

Potential beneficiaries may be wildly supportive of an effort/intervention, seeing it as an opportunity or the pathway to a better life or they may be indecisive or resentful toward it. . They may not understand it, or they may not see the benefit that will come from it. They may be afraid to try something new (such as irrigated agriculture since they have been doing rain fed farming), on the assumption that they'll fail, or will end up worse off than they are. They may be distrustful of any people or organizations engaged in such an effort/Intervention, and feel they're being looked down on.

- Some stakeholders may have **economic concerns**. Sometimes these concerns are merely selfish or greedy –but in most cases, they are legitimate.
- **Business people** may have concerns about such things how the intervention will open business opportunities or impact on their current ones.. While the may be good for the larger society, some businesses actually be hurt. Especially for very small business, where a slight change in profits may mean not a drop in share price, but the inability to sustain one's livelihood, this is a big issue (e.g sand harvesters in LNIDP).
- **Organizations, agencies, and institutions** may have a financial stake in an intervention because of funding concerns.
- Efforts that concern issues that are controversial for cultural reasons,(e.g project affecting burial sites) . While such issues may not be resolvable, it's important to understand the positions of stakeholders on both sides
- Ideological as well as cultural differences may also drive stakeholder interests. Those who believe that government shouldn't be seen as the source of anything but the most basic services
- Legislators (MPs and MCAs) and policy makers may be concerned with public perceptions that public money by funding a particular effort.
- The jobs of organization staff members engaged in carrying out an effort can be drastically changed by the necessity to learn new methods and ways of doing things.

Stakeholder analysis is only useful if it's used. Stakeholder management is where analysis and practice meet. It allows you to use the **analysis** to help gain support and buy-in for your effort/intervention.

is to understand clearly where each stakeholder lies in the g

Another way to look at stakeholder management – and remember that all the people and groups we're talking about here are stakeholders, those who can affect and are affected by the effort in question – is that the most important stakeholders are those most **dramatically affected**(LNIDP the farmers /beneficiaries).

Stakeholder management depends on an agencies/organisations purpose is in involving stakeholders. For instance LNIDP purpose is primarily participatory, with intention to strengthen ownership

Bringing people and interested groups into the process generally demands that you keep them involved and informed by:

- Treating them with respect
- Providing whatever information, training, mentoring, and/or other support they need to stay involved
- Finding tasks or jobs(roles) for them to do that catch their interest and use their talents
- Maintaining their enthusiasm with commendation, small tokens of appreciation, and continual reminders of the effort's accomplishments
- Engaging them in decision-making
- Utilising them in the conception, planning, implementation, and evaluation of the effort from its beginning
- In the case of those who start with little power or influence, helping them learn how to gain and exercise influence by working together and developing their capacities.

- Maintain stakeholders' and supporters' motivation, keep them informed, and/or continue to find meaningful work for them in order to keep them involved and active. Understanding and engaging stakeholders can be tremendously helpful to your intervention.

Stakeholders and their roles in irrigation development

	Stakeholder	Role	Key stakeholder
1	Farmers	<ul style="list-style-type: none"> - Provide relevant local knowledge - Owners of the land 	YES
2	National Irrigation Board	<ul style="list-style-type: none"> - Develop infrastructure and develop capacity of farmers for uptake of irrigated agriculture for improved soil management 	
3	Administrators DCCs, Chiefs, Ass. Chiefs, Elders	Their authority and ability to convene meetings is only necessary in the implementation stage	NO
4	Extension	Role in sharing experience with knowledge / technologies irrigation management and capacity building farmers	YES
5	Church	Encourage especially female farmers	YES
6	Ministry of agriculture		YES
7	Donors	Funding	YES

1.5 Session five: Legal Requirements

Specific Objectives

To understand the laws governing irrigation development in Kenya

Session Objectives

At the end of this session the participants should be able to

- i. Outline the various legal statutes and their importance
- ii. Discuss the importance of legalization of IWUA as a legal entity (Attorney general, Social services, Co-operative Act etc)
- iii. Explain the roles and functions of WRMA (Water permitting and water use charges)

Session Flow

- i. Legal statutes and their importance
- ii. Importance of legalization of IWUA as a legal entity
- iii. roles and functions of WRMA (Water permitting and water use charges)

Training Methodology

The training will be conducted through participative/interactive lectures, , group discussions and role plays

Participants (Target Audience) No. 30-50

Farmers

Community Leaders

Time when to conduct the training

At the beginning of project initiation

Training Materials

Flip charts, Posters, note books

Session Duration

Two hours

OBJECTIVES OF THE LESSON

Specifically, by the end of the session, the participants will be able to:

1. Discuss the need for Environmental Conservation;

2. Explain the Legal environmental requirements for Irrigation development (EMCA1999);
3. Discuss environmental impacts of Irrigated agricultural development;
4. Discuss how to reduce the effects of environmental impacts of irrigation development; and
5. Explain the role and purpose of water abstraction permit.

MAIN CONTENT OF THE LESSON (SUBJECT MATTERS)

1. Environmental conservation
2. Environmental impact of irrigation
3. EMCA Law of 1999
4. Water rights and permits

LESSON PLAN (SESSION FLOW)

The session flow should preferably follow the following order:

1. Define and discuss the importance of environment
2. Relate man and environment
3. Discuss the threats of environment
4. Enumerate the EMCA law
5. Discuss the acquisition rights of water
6. Discuss the requirements for permits
7. List the procedures of obtaining a permit

Environmental impacts of irrigation projects

What is Environment?

The term environment is used to describe ALL things that make up our surroundings on Earth

Why is the environment important?

The environment is important because:

- It is the source of livelihood for man and all other living organisms
- The existence and behavior of any living thing is influenced by its environment (Air, Water, food, Shelter)

Components of the environment

- The environment consist of two major natural components, non-living things, and living things
- Non-living things – these include the earths, land, water and atmosphere
- Living things - include All the earths plants, animals and people as well as bacteria and viruses

Man and the environment

- Wherever man lives, he changes the environment by adding his social (Man-made) environment.
- The man made environment is a system which man has organized himself into in order to cope with problems of his environment and to satisfy his needs

What does the man-made environment consist of?

Man needs to satisfy his basic needs, water, Food, and shelter, in addition clothing health and education employment etc.

The social environment consists of Villages and towns, Agricultural activities and industrial activities

How has man related to his environment?

His domestic, agricultural and industrial activities have harmed the environment in two main ways: -

- Natural resources such as fresh water, minerals, trees and soils have been overused and misused.
- The natural environment has been polluted in a number of ways

Threats to the environment

Threats to the environment are broadly classified as: -

- Pollution
- Overexploitation of our natural Resources

a) Pollution

Pollution occurs in three states: gaseous, liquid and solid

i. Air pollution

- Smoke
- Lead

- Carbon monoxide
 - Sulphur dioxide
 - CFCs
 - Noise
- ii. **Water pollution**
- Silt
 - Organic matter(Sewage)
 - Inorganic matter (chemical fertilizers)
 - Waste water (Soaps and detergents)
 - Oil Spill
- iii. **Land pollution**
- Insecticides- e.g. DDT
 - Community (wastes-disease breeding grounds for diseases)
 - Radiation

The Kenyan Law and the Environment

In 1999 the government enacted an act to manage the use of the environment to ensure sustainable development. It is called the Environmental Management and Coordination Act of 1999 (EMCA, 1999)

Aim:

To provide a regulatory framework for human activities that undermines the vital natural resources that support economic, social and cultural life as well as the very existence of man.

EMCA 1999

The Law states that every Kenyan has a right to a clean and healthy environment and has a duty to protect and enhance the Quality of the environment.

Guiding principles

- The principal of public participation
- The principal of Indigenous knowledge
- The principal of International cooperation
- The principal of inter-generational and intra-generational equity
- The polluter pays principal
- The precautionary principal

Key Pillars of EMCA 1999

1. Environment to include the public (*Locus standi*)
2. The Public Complaints Commission

3. Environmental Impact Assessment

- Identify impact of a project on the environment
- Predict likely changes on the environment
- Evaluate various alternatives to the project
- Propose mitigation measures for negative impacts
- Generate baseline data for monitoring and evaluation
- Facilitate decision makers make economically and environmentally sound decisions

Standards enforcement committee

•Fiscal incentives

- Tax relief
- User fees
- Customs waivers

•Environmental offences

- Pollution offences
- Destruction of forest reserves
- EIA violations
- Inspection violations

NEMA is the principal instrument of the government in implementing all policies and laws relating to the environment.

Water Legalization

a. Water vested in the State

Every water resource is vested in the state, subject to any rights of user granted by any written law.

b. Acquisition o water rights

No conveyance, lease or other instrument shall convey, assure, demise, transfer or vest any person any property or right or any interest priviledge in respect of any water resource shall acquire water rights without proper legal document.

c. Water resource management

For all water usages, permits to do so shall be acquired from the body rules otherwise advices.

State schemes and community projects.

Community project - a project owned and managed by local community, which operates by use of water under a permit.

State scheme – a scheme, whether formulated in detail or not, for the use of any public purpose of the whole or part of a water resource.

It should be noted that no permit for a community project can be cancelled with ministerial approval

d. Requirements for permit

A **permit** is required for the following purposes:

1. any use of water from a water resource
2. drainage of any swamp or other land
3. the discharge of a pollutant into any water resource

Permit not required for certain activities:

1. For the abstraction or use of water without the employment of works from any water resource for domestic purposes.
2. For any development of ground water, where one of the works necessary for the development are situated
 - within one hundred metres of any body of surface water other than in closed spring water
 - Within a ground water conservation area.
 - For the storage of water in or the abstraction of water from, a dam constructed in any channel or depression which does not constitute a water course.

e. Procedure for obtaining a permit

1. An application for a permit shall be made to WRMA.
2. WRMA has the mandate to accept or reject an application
3. If need arises, EIA shall be conducted
4. Any person opposed to the grant of a permit may object in writing to the WRMA.

f. Consideration for the issue of permits

In issuing a permit, and in fixing any conditions, certain factors are considered including:-

- a. existing lawful uses of the water
- b. efficient and beneficial use of water in the public interest
- c. any catchments management strategy applicable to the relevant water resource
- d. The likely effect of the proposed water use on the water resource and on other water users.
- e. The class and the resource quality objectives of the water resource, made by the water user in respect to the water use in question.
- f. The strategic importance of the proposed water use.
- g. The quality of water in the water resource, which may be required for the reserve and the probable duration of the activity, or undertaking for which a water use is to be authorized.

Variation of permit following hydrographical survey

Every permit is subject to variation due to hydrographical conditions of the relevant water body

ANNEX: 1 SAMPLE IWUA PROTOTYPE BY-LAWS

The Preface

This prototype By-laws/Constitution is for guidance only. However, whatever By-laws / Constitution the smallholder irrigation scheme may adopt, should in principle provide sufficient for the equity of rights and responsibilities among members, accountability and transparency in its operation.

Declaration

We are members of _____ clearly declare followings

- Egalitarianism: Equity of rights and responsibilities among the members is our management principle.
- We have agreed that we come together to make our community as a land with milk and honey for all the members can enjoy their life
- We have agreed that we remove off our petty selfishness to make our community prospers for the sake of our descendants
- We have agreed that our community has to be developed by ourselves by any means, because it is our own community
- We have agreed that we learn anything we need in order to develop our community
- A member is for whole members, whole members for one member
- We have agreed that all the members of the _____are important persons for the community
- We have agreed that dialog is the most important means to solve any problems among members
- We have agreed that we create following By-Laws/Constitution to make us one
- We have agreed that we pay all our effort to follow the By-Laws
- We have agreed that we transfer some of the rights and powers to the committee and executive committee to follow and to prosecute the By-Laws

PREPARATION OF BY LAWS

11-0 PART 1 – NAME

11-1 Article I - Name of the Organization

The name of the Organization; _____

Address; _____

The area the Organization is operating; _____

PART II – OBJECTIVES

Article II - Main Objectives

The main purpose of the Organization is to implement the irrigation system and to operate, maintain and manage the system for the betterment for the members of the Organization.

Article III - Specific Objectives

The Organization shall have the following principal objects:

To raise, mobilize and disburse funds and other resources for the promotion of the objects of the Organization;

To implement the irrigation system

To rehabilitate the irrigation system

To upgrade the irrigation system

To operate the irrigation system

To maintain the irrigation system

To determine and collect the water fee for OMM of the irrigation system

To determine and collect the charge for operation, maintenance and management of the irrigation system when it needs

To authorise the fair water distribution

To authorise the area to be irrigated and the kind of crops

To inspect of the irrigation and drainage system to establish a water distribution process to ensure prevention of wastage, misuse or unauthorised use of water

Maintenance will include:

- Silt clearance
- Weed clearance
- Repairs to structures
- Environmental protection

PART III - MEMBERSHIP

Article IV - Membership

Land owners in the group operating area

Tenancy rights holders

Who pays membership fee

Who pays water fee

Full-time basis in farming

Article V - Duties of the member

To pay the membership fee

To pay the water fee

To pay the water charge

To have a idea that water is a life line

To use the irrigation water efficiently

To join the maintenance work and repair work of the irrigation and drainage system when requested by Management Committee

Article VI - Right of the members

To have a right to get equal water allocation

To have a right to vote in General Meeting

To have a right to stand the election for Management Committee

Article VII - Disqualification of the Membership

Any member who defaults on his/her water fee or charge payment for a certain period shall cease to be a member of the Organization. However, the membership may be restored on payment of all the standing fees and an additional re- enrolment fee.

Any member who misuse the water or unauthorised water use after two times recorded warning within two years' period since the date of the first recorded warning shall be lost the membership for decided period by the Organization.

Any member who harm or break or destroy the irrigation and drainage system or water quality intentionally shall be disqualified immediately.

If any member of the group sells his/her land, his/her membership will be automatically cancelled, and new owner will be eligible for the group membership

PART IV - FUNCTION AND POWER OF THE ORGANIZATION

Article VI - Function

Implementation, operation, maintenance and management of the irrigation and drainage system

Demonstration and practice of farm water management methods for improving field application efficiency in the individual farmer's field

Utilise natural rain and ground water in the best way possible

Ensure responsible use of water among the members

Coordinate with various relevant Government Departments

Ensure collective and community responsibility of collection of water fee and charge from all the members

Article VII - Power

The Organization has a right to raise, mobilize and disburse funds and other resources for the promotion of the objects of the Organization

The Organization has the right to decide the water fee and charge payable by members.

The Organization has a right to collect the water fee and charge.

The Organization will resolve disputes among members in respect of water distribution and allied matters.

The Organization has the right to decide the fine or disqualification of the membership against the violation of misuse of water or unauthorized use of water or harming, breaking or destroying the irrigation and drainage system and water quality.

PART V - GOVERNANCE OF THE ORGANIZATION

Article VIII - The Management Structure

General Body

The general body of the Organization will consist of all registered members whose due payments are up date.

Management Committee

The Management Committee will consist of the following members:

One Chairperson

One Vice-chairperson

One Secretary

One Treasurer

Committee members

Article IX - Function and Power of the Management Committee

The management committee shall govern the day-to-day affairs of the Organization.

The Management Committee shall have the powers and duties necessary for the administration of the Organization and ensuring that the Organization's By-Laws are not violated. The following are some of their duties:

Decide the cropping pattern and area to be irrigated under each crop within the Organization area of operation.

Decide the irrigation schedule and water distribution.

Take care, upkeep and surveillance of the irrigation system in the area of operation of the Organization.

Designate, employ on remuneration and dismiss personnel necessary for the operation, maintenance and repairs of irrigation and drainage system.

Collect water fee and other contributions from the members.

Collect charges from the members for operation, maintenance and repairs of irrigation and drainage system

Raise/obtain funds from various sources for the smooth functioning of the Organization.

Ensure that the cashbook is well written and duly signed by the treasurer

Facilitate a smooth system for bookkeeping and auditing the Organization accounts.

Inspect irrigation and drainage system, distribution of water and ensure prevention of wastage, misuse or unauthorized use of water.

Take any necessary action to ensure and help fulfil the objectives of the Organization. In case of default in fee payment, the may suspend supply of water to the defaulting member and resume it on fulfilment of the terms and conditions.

5-3 Article X - Duties of the Members of the Management Committee

Chairperson

The Chairperson shall be the Chief Executive Officer of the Organization.

He/she shall have the general powers and duties which are vested in the office of the Chairperson of Organization including but not limited to the powers to appoint various committee and sub-committee from among the members of the Organization from time to time as he/she may in his discretion decide to be appropriate to assist in the day to day affairs of the Organization.

He/she shall preside over the meetings of the General Body and Management Committee and all other meetings of the Organization and conduct the proceedings.

In case of any legal dispute, the Chairperson will handle such cases on behalf of the Organization.

Vice-Chairperson

The Vice-Chairperson shall take the place of the Chairperson and perform his/her duties wherever the Chairperson is absent or unable to act under valid grounds.

If neither the Chairperson nor the Vice-Chairperson is able to act, then the Management Committee shall appoint some other member of the Management Committee to act on an interim basis.

The Vice-Chairperson shall also perform other duties as shall from time to General Body/Management Committee entrusts time to him/her.

Secretary

He/she shall keep the daily of the Organization, in which events, happenings and complaints in the area of operation are recorded.

He/she shall convene all meetings of the Organization and shall maintain the minutes of all meetings. He/she shall issue general circulars and notices and carry on all correspondences on behalf of the Organization.

He/she shall remain in charge of such books and papers as the General Body/Management Committee may direct and shall in general perform all duties incidental to the office of Secretary, i.e. execution of orders and resolutions of Management Committee.

All suits and matters instituted by or on behalf of the Organization shall be instituted in the name of the Secretary and all pleadings, warrants, power of attorney, petitions statements etc. shall be signed by the Secretary and likewise in all and matters against the Organization, the Secretary shall represent the Organization.

Treasurer

The Treasurer shall be responsible for receipt of all subscriptions, fees, charges, donations, grants and money, etc. from the various sources as provided in the By-Laws and issue receipts for the same.

He/she shall receive, disburse and maintain daily accounts and shall at the end of the financial year get the same audited by the authorized Auditor and furnishes an audited statement of all receipts and expenditures to the Management Committee.

6-0 PART VI - BUSINESS TRANSACTION

6-1 Article XI

Through the mandate by the General Body, the Management Committee by means of resolutions passed at duly convened meetings shall transact the business of the Organization.

7-0 PART VII - ELECTION AND TENURE OF MANAGEMENT

COMMITTEE MEMBERS

7-1 Article XII - Election

In case the Organization has a several branches of irrigation and drainage system;

The Committee Member/Members will be elected by the members of the respective branch to represent the branch.

Option One

The Chairperson, Vice-Chairperson, Secretary, Treasurer and Committee Members will be elected by the members of the Organization.

Option Two

Step 1

The Committee Members will be elected by the members of the Organization.

Step 2

The Chairperson, Vice-Chairperson, Secretary and Treasurer will be elected among the Committee Members by the Committee Members.

The posts will not carry any remuneration.

The members shall decide the tenure of the office of the elected Management Committee.

The Management Committee will consist of the following members:

Chairperson

Vice-chairperson

Secretary

Treasurer

Committee members

FUNCTIONS AND POWERS OF THE MANAGEMENT COMMITTEE

The Management Committee shall have the powers and duties necessary for the administration of the Organization and ensuring that the By-Laws is not violated. The following are some of their duties:

Decide the irrigation schedule and water distribution.

Take care, upkeep and surveillance of the irrigation system in the area of operation of the Organization.

Designate, employ on remuneration and dismiss personnel necessary for the operation, maintenance and repairs of irrigation and drainage system.

Levy charges from the members for operation, maintenance and repairs of irrigation and drainage system.

Collect water fee and other contributions from the members.

Raise/obtain funds from various sources for the smooth functioning of the Organization.

Ensure that the cashbook is well written and duly signed by the treasurer
Facilitate a smooth system for bookkeeping and auditing the Organization accounts.
Inspect irrigation and drainage system, distribution of water and ensure prevention of wastage, misuse or unauthorized use of water.
Scrutinize accounts kept by Secretary and/or Treasurer and ensure the registers and account books are well kept and take steps for the recovery of all sums due to the IWUA.
Prepare annual budget and get approval from the General Body.
Listen and deal with complaints of the members and resolve disputes.
Liaise with Relevant Government Departments.
Utilise natural rain and ground water in the best way possible together with irrigation water
Educate farmers in cropping pattern, water management, optimal and efficient use of water and inputs for increasing agricultural production, yields and their profits.
Take any necessary action to ensure and help fulfil the objectives of the Organization. In case of default in fee payment, the Organization may suspend supply of water to the defaulting member and resume it on fulfilment of the terms and conditions.

DUTIES OF MEMBERS OF THE MANAGEMENT COMMITTEE

CHAIRPERSON

The Chairperson shall be the Chief Executive Officer of the Organization.
He/she shall have the general powers and duties which are vested in the office of the Chairperson of Organization including but not limited to the powers to appoint various committee and sub-committee from among the members of the Organization from time to time as he/she may in his discretion decide to be appropriate to assist in the day to day affairs of the Organization.
He/she shall preside over the meetings of the General Body and Management Committee and all other meetings of the Organization and conduct the proceedings.
In case of any legal dispute, the Chairperson will handle such cases on behalf of the IWUA.

VICE-CHAIRPERSON

The Vice-Chairperson shall take the place of the Chairperson and perform his/her duties wherever the Chairperson is absent or unable to act under valid grounds.
If neither the Chairperson nor the Vice-Chairperson is able to act, then the Management Committee shall appoint some other member of the Management Committee to act on an interim basis.
The Vice-Chairperson shall also perform other duties as shall from time to General Body/Management Committee entrusts time to him/her.

SECRETARY

He/she shall convene all meetings of the IWUA and shall maintain the minutes of all meetings. He/she shall issue general circulars and notices and carry on all correspondences on behalf of the IWUA. E/she shall remain in charge of such books and papers as the General Body/Management Committee may direct and shall in general perform all duties incidental to the office of Secretary, i.e. execution of orders and resolutions of Management Committee.

All suits and matters instituted by or on behalf of the IWUA shall be instituted in the name of the Secretary and all pleadings, warrants, power of attorney, petitions statements etc. shall be signed by the Secretary and likewise in all and matters against the IWUA, the Secretary shall represent the Organization.

TREASURER

The Treasurer shall be responsible for receipt of all subscriptions, fees, charges, donations, grants and money, etc. from the various sources as provided in the by-laws and issue receipts for the same. E/she shall receive, disburse and maintain daily accounts and shall at the end of the financial year get the same audited by the authorized Auditor and furnishes an audited statement of all receipts and expenditures to the Management Committee.

BUSINESS TRANSACTIONS

Through the mandate by the General Body, the Management Committee by means of resolutions passed at duly convened meetings shall transact the business of the Organization.

VACANCIES

Any of the Management Committee members may at any time by notification in writing to the Management Committee retire from office.

Any Management Committee member, who fails to attend three consecutive meetings of the Management Committee without sufficient reason given in writing to the Management Committee, will automatically cease to be a member of the Management Committee.

The members of the Management Committee shall be eligible for reappointment.

REMOVAL OF OFFICE BEARERS:

Upon an affirmative vote by a majority of more than 50% of members of the General Body of the Organization any of the office bearers may be removed with cause and his/her successor elected as per procedure laid down.

DUTIES OF OFFICE BEARERS:

MEETINGS:

Meetings of the Management Committee of the Organization shall be held in the office of the Organization or at any other suitable place convenient to the members from time to time, but at least once in a month during the irrigation season. The first meeting of the newly constituted Management Committee shall be held within ten days of election of office bearers.

The Organization General Body annual meeting will be held in the month of June every year. The elected Management Committee members shall be present at such meetings in accordance with the by-laws. The General Body will decide on policy matters and allocate funds for operation and maintenance. The members may also transact such other business of the Organization as may deemed necessary. The will also approve the annual Budget and contribution from members. The audited accounts of the annual report will be read out in the meeting.

Special meetings of the Organization shall be called by the Chairperson as decided by the Management Committee or upon a petition signed by at least ten percent of members having been presented to the Secretary. The notice of any special meeting shall state the time and place of such meeting and the purpose/agenda thereof.

The minutes of the meetings shall be recorded, prepared and kept by the Secretary and shall be signed by the person presiding over the meetings. The minutes shall be read out and confirmed at the respective subsequent meetings.

NOTICE OF MEETINGS

It shall be the duty of the Secretary to inform or send notice of each General/Special meetings stating the purpose/agenda thereof as well as the time and venue of meetings to each member at least seven days prior to such meetings.

ADJOURNED MEETINGS

A meeting may be adjourned for lack of quorum or any other unavoidable reason by the members present to a time not less than 24 hours from the time of the original meeting was called.

ORDERS OF BUSINESS MEETINGS

The orders of Business at all meetings of the IWUA shall be as follows:

Name and signature/thumb impression of all members present.

Proof of notice of meeting.

Reading out the minutes of the preceding meeting and ratification thereof.

Report, if any, of committee set up. Unfinished business, if any.

New business as per agenda and passing resolution.

Vote of thanks.

QUORUM

For a meeting to take off, one third of the total members shall make a quorum for the transaction of business. A meeting that falls short of quorum shall be adjourned from time to time and at any such adjourned meeting any business which might have been transacted as originally called may be transacted without further notice, provided there is a quorum present.

VOTE

Every member shall have the right to vote and shall have only one vote. The Chairperson shall have a casting vote in case of a tie.

RIGHT OF ENTRY

Every member shall get the right of entry to the Chairperson, the Vice-Chairperson, the Secretary, the Treasurer and Members of the Management Committee or to any other person authorized by the Management Committee for inspection, supervision or for any inquiry in respect of disputes regarding sharing of water, maintenance and repairs of the irrigation and drainage networks.

FUNDS

An Operation and Maintenance Fund by the IWUA in all or any of the following ways will be raised:

by shares.

by contribution from members

by donations from the members, other institutions, Government or any other Donors

by receiving subsidies, grant-in-aid from the Government or other Donors

ACCOUNTS

The accounting years will be from 1st July to 30th June of the next year. The IWUA shall on or before 31st December in each year publish and audit annual financial statements containing the following accounts:

The profit and loss accounts

The receipts and expenditure of the previous year

A summary of the property and assets and liabilities giving such particulars as will disclose the general nature of the liabilities and assets and how the value of fixed assets has been arrived at. The following registers are to be maintained and presented to the members of the IWUA.

Members register

Irrigation schedule

Daily cash transaction account

Receipt book

Monthly cash transaction amount

Permanent term deposit account

Assets account

Minutes book

Complaint register

Visitors' book

The Accounts for maintenance and repair of irrigation and drainage network should be kept.

PUBLICATION OF ACCOUNTS AND REPORTS

Copies of the following should be kept in a conspicuous place in the office of the IWUA:

The last financial statement

The Auditor's report

Receipt and expenditure accounts, balance sheet, together with a report shall be placed before the General Meeting after the expiration of each financial year.

APPOINTMENT OF AUDITORS

At a general meeting, the IWUA shall appoint an auditor. The auditor's duties are:

to audit the IWUA accounts prepared by the management committee

to examine the annual returns and verify the same with the related accounts

Write a special report to the IWUA on the accounts indicating whether they are correct and in case they are incorrect, report in what respect he finds the reports incorrect or not in accordance to the law.

POWER OF AUDITOR

The Auditor has the right to call for an examination of any papers or documents belonging to the IWUA and shall make a special report to the IWUA upon any matter connected with the accounts which appears necessary for such reporting.

SUITS AND LEGAL PROCEEDINGS

The IWUA shall sue and shall be sued in the name of the Secretary of the IWUA.

AMENDMENTS OF THE BY-LAWS

The by-laws may be amended by the IWUA in a meeting duly called for such purpose. No amendment can be effected unless approved by two thirds of the IWUA`s members.

LIQUIDATION/DISSOLUTION

The IWUA may be dissolved by a special resolution passed by two thirds of the members and shall be confirmed in writing.

2.0 MODULE II: LEADERSHIP AND CONFLICT MANAGEMENT IN IWUA

Broad Objective:

To impart knowledge and skills to participants on leadership, problem solving and conflict management to improve their capacity for effective management of irrigation projects.

Specific Objectives:

The participant should be able to:

- Understand leadership concepts.
- Understand the IWUA structure and leadership roles.
- Understand the potential conflicts dimensions in irrigation project.
- Understand conflict management mechanism in irrigation project
- Understand IWUA management functions.

Training flow

- Leadership concepts.
- IWUA structure and leadership roles.
- Potential conflicts dimensions in irrigation project.
- Conflict management mechanism in irrigation project
- IWUA management functions

Training Methodology: The training will be conducted through Participative /Interactive lectures, case study, group discussions and role play.

Participants: The expected participants in this module will be the IWUA Executive committee, IWUA subcommittees and IWUA representatives from the blocks/units.

Training Materials: The materials used in the training will be Flow charts, markers, projectors, Scheme Layout etc.

Training Venue: Proposed venues include CHURCHES, SOCIAL HALLS, and Agricultural Training Centre's.

Evaluation: Evaluation is to be conducted through open discussions, evaluation questionnaires.

Timing: Training to be conducted after formation of IWUA.

Session Duration

i. The whole module will be covered in two hour per session in one to two days

No of participants: maximum of 30 - 40 participants per session

2.1 SESSION ONE: INTRODUCTION TO LEADERSHIP CONCEPTS

Objective

To understand leadership concepts

Specific objectives

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

- Define leadership
- To explain the qualities & characteristics of good leaders
- To describe the different styles of leadership
- To explain the advantages & disadvantages of the different leadership styles

Session flow

- Leadership
- Qualities & characteristics of good leaders
- Styles of leadership advantages & disadvantages of the different leadership styles

Training Methodology: The training will be conducted through Participative /Interactive lectures, case study, group discussions and role play.

Participants: The expected participants in this module will be the IWUA Executive committee, IWUA subcommittees and IWUA representatives from the blocks/units.

Training Materials: The materials used in the training will be Flow charts, markers, projectors, Scheme Layout etc.

Training Venue: Proposed venues include CHURCHES, SOCIAL HALLS, and Agricultural Training Centre's.

Evaluation: Evaluation is to be conducted through open discussions, evaluation questionnaires.

Timing: Training to be conducted after formation of IWUA

Session Duration: The session will take two hours

No of participants: maximum of 30 - 40 participants per session

➤ **What is leadership?**

Leadership is about influencing and directing people towards accomplishing tasks or to achieve a desired goal. It is a facilitative process that involves the shaping of the behaviour, attitude, beliefs and values of people to help the leader in carrying out tasks. A leader is a person who has ability to influence the community to work in harmony and to achieve a set goal in an organization.

➤ **Elements of leadership**

- A leader leads others towards achieving a goal
- There must be a specific task to be carried out
- There must be followers, members or a team who are being influenced
- The leader must have some authority and power to be able to influence the followers towards accomplishment of tasks or achieving a goal.

➤ **Qualities & characteristics of good leaders**

Group activity one

- Ask the participant to mention the leader that they think is a good leader and state why
- List all the leaders that are mentioned on the flipchart
- Let the team discuss each leader and develop a consensus on the best qualities
- Display the qualities agreed upon in front for everyone to see

➤ **Good leadership**

- Guiding vision: Effective leaders know what they want to do, and have the strength of character to pursue their objectives in the face of opposition and in spite of failures. The effective leader establishes achievable goals.
- Passion: Effective leaders believe passionately in their goals. They have a positive outlook on who they are, and they love what they do. Their passion for life is a guiding star for others to follow, because they radiate promise!

- Integrity: Because they know who they are, effective leaders are also aware of their weaknesses. They only make promises they can follow through on.
- Honesty: Leaders convey an aura of honesty in both their professional and their personal lives.
- Trust: Effective leaders earn the trust of their followers and act on behalf of their followers.
- Curiosity: Leaders are learners. They wonder about every aspect of their charge. They find out what they need to know in order to pursue their goals.
- Risk: Effective leaders take calculated risks when necessary to achieve their objectives. If a mistake is made, the effective leader will learn from the mistake and use it as an opportunity to explore other avenues.
- Dedication: The effective leader is dedicated to his or her charge, and will work assiduously on behalf of those following. The leader gives himself or herself entirely to the task when it is necessary.
- Charisma: This may be the one attribute that is the most difficult to cultivate. It conveys maturity, respect for your followers, compassion, a fine sense of humor, and a love of humanity. The result is that leaders have the capability to motivate people to excel.
- Listening: Leaders listen! This is the most important attribute of all, listen to your followers.

➤ **Styles of leadership**

Autocratic leader: This leader centralizes leadership does not allow any participation that motivates sub-ordinates. His motto is that of, “I will help you if you obey me”

Democratic leader: Democratic leader decentralizes power and allows for group participation in decision making .The motto of this leader is “Do you agree with my views”

Free-Reign (laizzer-faire): A laizzer –faire leader may be described as a ‘‘No decision- making’’ leader since he is passive and has no initiatives of his own. His motto is ‘‘what do you want to do to it’’

Dictator: This leader leads with an iron hand and subordinates live under fear. His leadership code is ‘‘you must do what I say’’

Visionary leader: This is a leader who lives in the future, he set targets and works towards the achievement of the goals

➤ **Advantages of good leadership styles**

Democratic and visionary leaders:

- Take control of themselves
- Assume responsibility for whom they are
- Convey a positive and dynamic attitude in everything they do
- Accept blame: learn from their own mistakes as well as those of others. Take blame for everything that happens in their unit
- Give credit wherever it is due
- Are compassionate when they review their team members' progress or lack thereof
- Think great thoughts. Small thinking is why companies go broke
- Turn disasters into opportunities. Turn every obstacle into a personal triumph
- Determine their "real" goals then strive to achieve them
- When they want to tell someone something important, they do it personally
- Are not afraid to get their hands dirty doing what they ask others to do. Make coffee
- Listen effectively
- Encourage teamwork and participation

- Empower team members
- Communicate effectively
- Emphasize long-term productivity
- Make sound and timely decisions
- Treat each person as an individual
- Knows themselves and their team
- Protect their team
- Have vision, courage and commitment

➤ **Disadvantage of bad leadership styles**

Free reign and dictators do not:

- Take control of themselves
- Assume responsibility for whom they are
- Convey a positive and dynamic attitude in everything they do
- Accept blame nor learn from their own mistakes as well as those of others. They do not take blame for everything that happens in their unit
- Give credit wherever it is due
- Have compassionate when they review their team members' progress or lack thereof
- Think great thoughts. Small thinking is why companies go broke
- Turn disasters into opportunities. They never turn every obstacle into a personal triumph
- Determine their "real" goals nor strive to achieve them

- Get their hands dirty doing what they ask others to do.
- Listen effectively
- Encourage teamwork and participation
- Empower team members
- Communicate effectively
- Emphasize long-term productivity
- Make sound and timely decisions
- Treat each person as an individual
- Know themselves and their team
- Protect their team
- Have vision, courage and commitment

2.2 SESSION TWO: IWUA STRUCTURE AND LEADERSHIP ROLES

Specific objective

To understand the IWUA structure and leadership roles

Session objectives

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

- Explain IWUA organizational structure
- Outline IWUA functions
- Explain IWUA leadership roles

Session flow

- IWUA organizational structure
- IWUA functions
- IWUA leadership roles

Training Methodology: The training will be conducted through Participative /Interactive lectures, case study, group discussions and role play.

Participants: The expected participants in this module will be the IWUA Executive committee, IWUA subcommittees and IWUA representatives from the blocks/units.

Training Materials: The materials used in the training will be Flow charts, markers, projectors, Scheme Layout etc.

Training Venue: Proposed venues include CHURCHES, SOCIAL HALLS, and Agricultural Training Centre's.

Evaluation: Evaluation is to be conducted through open discussions, evaluation questionnaires.

Timing: Training to be conducted after formation of IWUA

Session Duration: The session will take two hours

No of participants: maximum of 30 - 40 participants per session

➤ IWUA organizational structure

What is an IWUA?

Irrigation Water Users Association (IWUA) is a group of farmers that are organised at the level of a secondary canal. It can be described as a group of farmers who provide a service of irrigation water to their members who pay for this service (irrigation service fee) in a shared service area well demarcated by operation hydraulic boundaries (blocks/units). IWUAs are self-managed organizations governed by their members, but due to the public interest of the interest in the irrigation systems, their tasks are subject to some form of supervision by the government/or agencies mandated by the government

i. Members of an IWUA

Membership in the IWUA is mandatory for every person with the land use right within the “service area” of an IWUA (i.e. the land capable of being supplied with irrigation water from the irrigation system operated by the IWUA). The membership obligation is not personal to the farmer as such; rather it is linked to the land which he/she has use rights.

Compulsory membership is essential to ensure IWUA sustainability. This prevents non-members who receive surface irrigation water in the service area from free-riding. It prevents people from benefiting from irrigation water without contributing to costs of the operation and maintenance and other investments in the irrigation infrastructure and management.

ii. Governing bodies of IWUAs

IWUAs are self-managed organizations and governed by their members through the General Assembly. In addition to the General Assembly, each IWUA has a Management Committee and the Dispute Resolution Committee is optional.

General Assembly

The General Assembly is the sovereign, or main decision making body of each IWUA. Key tasks in this respect are the election of the Management Committee, and the approval of the level of the irrigation service fee and annual operation and maintenance charges.

Management Committee

The Management Committee (5 – 12 persons) is elected by the General Assembly and is in charge of ensuring the smooth day to day operation of the IWUA according to decisions made by the General Assembly.

➤ IWUA functions

- The IWUA tasks are all related to operation and maintenance of the irrigation and drainage system located within its service area. Roles and related tasks of IWUAs can be sorted into three categories:
- Governance,
- Operation and maintenance
- Management:

i. Governance (or social management)

This role relates to the role and responsibilities of the General Assembly: election of members of governing bodies, action planning, and preparing reports, and adoption and amendment of regulations that govern day to day activities of an IWUA. Examples of operational rules include rules related to water distribution, maintenance of irrigation infrastructures, type and level of sanctions for violation of the rules, and defaults of payment of the irrigation service fee.

ii. Operation and maintenance (O&M)

This role includes all activities that deal with planning, implementation and monitoring of water distribution and maintenance works, and training IWUA members in irrigation techniques and/or water saving methods.

iii. Management

This role relates to the administration of the IWUA and the financial management.

➤ IWUA leadership roles

- Guiding the team to develop a vision, setting objectives and tasks to be carried out
- Guide the team in coming up with a clear mission
- Guide the team in planning and setting of objectives and targets
- Guide the team in organizing the work and work scheduling

- Co-ordinate and motivate the team
- Guide the team in monitoring, control and taking of any remedial action
- Evaluate performance and give feedback.

2.3 SESSION THREE: POTENTIAL CONFLICT DIMENSIONS IN IRRIGATION PROJECTS

Specific objective

To understand the potential conflicts dimensions in irrigation project

Session objectives

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

- Define conflict
- Outline the causes of conflicts
- Outline types of conflicts

Session flow

- Conflict
- Outline the causes of conflicts
- Outline types of conflicts

Training Methodology: The training will be conducted through Participative /Interactive lectures, case study, group discussions and role play.

Participants: The expected participants in this module will be the IWUA Executive committee, IWUA subcommittees and IWUA representatives from the blocks/units.

Training Materials: The materials used in the training will be Flow charts, markers, projectors, Scheme Layout etc.

Training Venue: Proposed venues include CHURCHES, SOCIAL HALLS, and Agricultural Training Centre's.

Evaluation: Evaluation is to be conducted through open discussions, evaluation questionnaires.

Timing: Training to be conducted after formation of IWUA

Session Duration: The session will take two hours

No of participants: maximum of 30 - 40 participants per session

➤ **Define conflict**

A conflict is identified as *a disagreement through which the parties involved perceive a threat to their needs, interests or concerns.*

➤ **Causes of conflicts**

Group activity two

The participants should be asked to identify the common sources conflicts they are familiar with. Early reviews in the field of conflict resolution identified a large number of schemes for describing sources or types of conflict (Fink, 1968; Mack & Snyder, 1958). One of the early theorists on conflict, Daniel Katz (1965), created a typology that distinguishes three main sources of conflict: economic, value, and power.

i. Causes related to economics

Economic conflict involves competing motives to attain scarce resources. Each party wants to get the most that it can, and the behaviour and emotions of each party are directed toward maximizing its gain. Union and management conflict often has as one of its sources the incompatible goals of how to slice up the “economic pie”.

ii. Causes related to value

Value conflicts involves incompatibility in ways of life, ideologies – the preferences, principles and practices that people believe in. International conflict (e.g., the Cold War) often has a strong value component, wherein each side asserts the rightness and superiority of its way of life and its political-economic system.

iii. Causes related to power conflict

Power conflict occurs when each party wishes to maintain or maximize the amount of influence that it exerts in the relationship and the social setting. It is impossible for one party to be stronger without the other being weaker, at least in terms of direct influence over each other. Thus, a power struggle ensues which usually ends in a victory and defeat, or in a “stand-off” with a continuing state of tension. Power conflicts can occur between individuals, between groups or between nations, whenever one or both parties choose to take a power approach to the

relationship. Power also enters into all conflict since the parties are attempting to control each other.

Group activity 3

Ask the participants to state the types of conflict which are common within their association

➤ **Types of conflicts/ conflict dimensions**

There are two categories of conflicts including personal and interpersonal conflicts

➤ **Personal conflicts**

Conflict can occur at a number of levels of human functioning. Conflict in your head between opposing motives or ideas is shown by your “internal dialogue” and is at the intrapersonal level. Beyond that, the primary concern here is with social conflict, i.e., conflict between people whether they are acting as individuals, as members of groups, or as representatives of organizations or nations.

➤ **Interpersonal conflict**

Interpersonal conflict occurs when two people have incompatible needs, goals, or approaches in their relationship. Communication breakdown is often an important source of interpersonal conflict and learning communication skills is valuable in preventing and resolving such difficulties. At the same time, very real differences occur between people that cannot be resolved by any amount of improved communication.

i. Personality conflict

“Personality conflict” refers to very strong differences in motives, values or styles in dealing with people that are not resolvable. For example, if both parties in a relationship have a high need for power and both want to be dominant in the relationship, there is no way for both to be satisfied, and a power struggle ensues. Common tactics used in interpersonal power struggles include the exaggerated use of rewards and punishments, deception and evasion, threats and emotional blackmail, and flattery or ingratiation. Unresolved power conflict usually recycles and escalates to the point of relationship breakdown and termination.

ii. Role conflicts

Role conflict involves very real differences in role definitions, expectations or responsibilities between individuals who are interdependent in a social system. If there are ambiguities in role definitions in an organization or unclear boundaries of responsibilities, then the stage is set for

interpersonal friction between the persons involved. Unfortunately, the conflict is often misdiagnosed as interpersonal conflict rather than role conflict, and resolution is then complicated and misdirected. The emotional intensity is often quite high in role conflict since people are directly involved as individuals and there is a strong tendency to personalize the conflict.

iii. Intergroup conflict

Intergroup conflict occurs between collections of people such as ethnic or racial groups, departments or levels of decision making in the same organization, and union and management. Competition for scarce resources is a common source of intergroup conflict, and societies have developed numerous regulatory mechanisms, such as collective bargaining and mediation, for dealing with intergroup conflict in less disruptive ways. Social-psychological processes are very important in intergroup conflict (Fisher, 1990). Group members tend to develop stereotypes (oversimplified negative beliefs) of the opposing group, tend to blame them for their own problems (scapegoating), and practice discrimination against them. These classic symptoms of intergroup conflict can be just as evident in organizations as in race relations in community settings.

Intergroup conflict is especially tense and prone to escalation and intractability when group identities are threatened. The costs of destructive intergroup conflict can be extremely high for a society in both economic and social terms.

iv. Multi-party conflict

Multi-Party Conflict occurs in societies when different interest groups and organizations have varying priorities over resource management and policy development. These complex conflicts typically involve a combination of economic, value and power sources. This complexity is often beyond the reach of traditional authoritative or adversarial procedures, and more collaborative approaches to building consensus are required for resolution (Cormick et al, 1996; Gray, 1989).

v. International conflict

International conflict occurs between states at the global level. Competition for resources certainly plays a part, but value and power conflict are often intertwined and sometimes predominate. The differences are articulated through the channels of diplomacy in a constant game of give and take, or threat and counter threat, sometimes for the highest of stakes.

Mechanisms of propaganda can lead to many of the same social-psychological distortions that characterize interpersonal and intergroup conflict.

2.4 SESSION FOUR : CONFLICT MANAGEMENT MECHANISMS

Specific objective

To understand conflict management mechanism in irrigation project

Session objective

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

- Explain steps in conflict analysis
- Explain conflict management mechanisms

Session flow

- Steps in conflict analysis
- Conflict management mechanisms

Training Methodology: The training will be conducted through Participative /Interactive lectures, case study, group discussions and role play.

Participants: The expected participants in this module will be the IWUA Executive committee, IWUA subcommittees and IWUA representatives from the blocks/units.

Training Materials: The materials used in the training will be Flow charts, markers, projectors, Scheme Layout etc.

Training Venue: Proposed venues include CHURCHES, SOCIAL HALLS, and Agricultural Training Centre's.

Evaluation: Evaluation is to be conducted through open discussions, evaluation questionnaires.

Timing: Training to be conducted after formation of IWUA

Session Duration: The session will take two hours

No of participants: maximum of 30 - 40 participants per session

➤ Steps in conflict analysis and resolution

- Avoid jumping to a solution
- Describe the facts:
- Define the conflict
- Diagnose the conflict:
- Consider the alternatives,
- Implement the solution that has been chosen.
- Evaluate the solution. If the unsatisfactory situation still exists, begin the process again.

➤ **How do different persons deal with conflict when it occurs?**

- Directive - Tries to take the initiative to settle things, unafraid to act strongly. Main concern is that the problem is resolved quickly and doesn't drag on.
- Compromising- Tries to find a middle ground between the two parties. (S)he believes that everyone has to give up a little in order to reach an agreement. Main concern is that the solution is fair to both parties.
- Smoothing/Harmonizing- Tries to defuse the conflict and direct attention elsewhere. Main concern is that no one gets too upset, that emotions don't become too strong.
- Avoiding- Steps back from conflict situations, may believe that it is the best for the two parties to work things out on their own, or that problems will resolve themselves given time. Main concern is to not get involved in conflicts.
- Appealing to a third party - Tries to find someone who can help or mediate. May believe (sometimes correctly) that the two parties are not capable of finding a solution. Main concern is to bring in someone who has the necessary skills so that the problem gets resolved.

Regardless of the level of conflict, there are differing approaches to deal with the incompatibilities that exist. Conflict can result in destructive outcomes or creative ones depending on the approach that is taken. If we can manage conflict creatively, we can often find new solutions that are mutually satisfactory to both parties. Sometimes this will involve a distribution of resources or power that is more equitable than before, or in creating a larger pool of resources or forms of influence than before. Creative outcomes are more probable when the

parties are interdependent, i.e., each having some degree of independence and autonomy from which to influence the other, rather than one party being primarily dependent on the other. Given interdependence, three general strategies have been identified that the parties may take toward dealing with their conflict; win-lose, lose-lose, and win-win (Blake, Shepard & Mouton, 1964).

➤ **Methods of resolving conflicts**

i. **Win -lose**

The win-lose approach is all too common. People learn the behaviours of destructive conflict early in life – competition, dominance, aggression and defense permeate many of our social relationships from the family to the school playground. The “fixed pie” assumption is made, often incorrectly, that what one party gains, the other loses. The strategy is thus to force the other side to capitulate. Sometimes, this is done through socially acceptable mechanisms such as majority vote, the authority of the leader, or the determination of a judge. Sometimes, it involves secret strategies, threat, innuendo – whatever works is acceptable, i.e., the ends justify the means. There is often a strong we-they distinction accompanied by the classic symptoms of intergroup conflict. The valued outcome is to have a victor who is superior, and a vanquished who withdraws in shame, but who prepares very carefully for the next round. In the long run, everyone loses.

➤ **Approaches used in win-lose strategy**

i. Power based approach

- We could decide the outcome by a power struggle.
- Like rights determinations, power struggles are very risky.
- Additionally, they are usually very costly for both winner and loser, so much so that both parties may end up losing.

ii. Rights based approach

- We can decide who is right by going to a judge or an arbitrator and both trying to convince him or her that we are right and the other person is wrong.
- The judge or arbitrator will consider the terms of our contract, and will also consider any legal principles from statute or common law that apply in our case. Rights are seldom black and white so the process is risky.

- Neither of us can be sure we'll win. We also have little flexibility about the result – either the lease is renewed on the terms set out in our lease or it isn't.

➤ **Arbitration**

- Arbitration is a dispute resolution process in which the disputing parties present their case to a third party intermediary (or a panel of arbitrators) that examine all the evidence and then make a decision for the parties.
- This decision is usually binding. Like court-based adjudication, arbitration is adversarial.
- The presentations are made to prove one side right, the other wrong. Thus the parties assume they are working against each other, not cooperatively.
- Arbitration is generally not as formal as court adjudication, however, and the rules can be altered to some extent to meet the parties' needs.

ii. **Lose-lose**

The lose-lose strategy is exemplified by smoothing over conflict or by reaching the simplest of compromises. In neither case is the creative potential of productive conflict resolution realized or explored. Disagreement is seen as inevitable, so therefore why not split the difference or smooth over difficulties in as painless a way as possible? Sometimes, this is indeed the reality of the situation, and the costs are less than in the win-lose approach, at least for the loser. Each party gets some of what it wants, and resigns itself to partial satisfaction. Neither side is aware that by confronting the conflict fully and cooperatively they might have created a more satisfying solution. Or the parties may realistically use this approach to divide limited resources or to forestall a win-lose escalation and outcome.

iii. **Win-Win**

The win-win approach is a conscious and systematic attempt to maximize the goals of both parties through collaborative problem solving. The conflict is seen as a problem to be solved rather than a war to be won. The important distinction is we (both parties) versus the problem, rather than we (one party) versus they (the other party). This method focuses on the needs and constraints of both parties rather than emphasizing strategies designed to conquer. Full problem definition and analysis and development of alternatives precedes consensus decisions on mutually agreeable solutions. The parties work toward common and superordinate goals, i.e.,

ones that can only be attained by both parties pulling together. There is an emphasis on the quality of the long term relationships between the parties, rather than short term accommodations. Communication is open and direct rather than secretive and calculating. Threat and coercion are proscribed. The assumption is made that integrative agreements are possible given the full range of resources existing in the relationship. Attitudes and behaviors are directed toward an increase of trust and acceptance rather than an escalation of suspicion and hostility. The win-win approach requires a very high degree of patience and skill in human relations and problem solving.

➤ **Approaches used win-win strategy**

a) Interest based approach

Dispute resolution methods that are based primarily on the interests of the parties and not primarily on their rights and powers

➤ **Negotiation**

- *Negotiation is a process by which people with different viewpoints attempt to reach a resolution on issues about which there is a dispute or conflict.* The parties themselves control the process they use. Resolution is reached only upon mutual agreement.
- Why: To avoid dominance by one or more parties and to ensure a "win-win" situation where all parties get their needs met.

➤ **Negotiation skills**

- Empathy
- Paraphrasing
- Assertiveness
- Active listening
- Use of effective/open ended questions

ii. **Mediation**

Mediation is a process in which a third-party neutral assists in resolving a dispute between two or more other parties. It is a non-adversarial approach to conflict resolution.

Mediation is widely used in all sorts of disputes, ranging from divorces to civil lawsuits to very complex public policy problems to international conflicts

➤ **Qualities of a good mediation process**

- Voluntary - You can leave at any time for any reason, or no reason.
- Collaborative - everyone is motivated to work together to solve the issues and reach best agreements.
- Controlled - Each participant has complete decision-making power and a veto over each and every provision of any mediated agreement.
- Confidential - Mediation is generally confidential, as you desire and agree, be that by statute, contract, and rules of evidence and/or privilege.
- Informed - The mediation process offers a full opportunity to obtain and incorporate legal and other expert information and advice.
- Impartial, Neutral, Balanced and Safe - The mediator has an equal and balanced responsibility
- Self-Responsible and satisfying.

2.5 SESSION FIVE: IWUA LEADERSHIP MANAGEMENT FUNCTIONS

Specific objective

To understand IWUA management functions

Session objectives

At the end of this session, the participants should be able to explain functions of:

- Explain functions of; Planning
- Organizing
- Directing
- Problem solving
- Monitoring & Evaluation

Session flow

- Planning
- Organizing
- Directing
- Problem solving
- Monitoring & Evaluation

Training Methodology: The training will be conducted through Participative /Interactive lectures, case study, group discussions and role play.

Participants: The expected participants in this module will be the IWUA Executive committee, IWUA subcommittees and IWUA representatives from the blocks/units.

Training Materials: The materials used in the training will be Flow charts, markers, projectors, Scheme Layout etc.

Training Venue: Proposed venues include CHURCHES, SOCIAL HALLS, and Agricultural Training Centre's.

Evaluation: Evaluation is to be conducted through open discussions, evaluation questionnaires.

Timing: Training to be conducted after formation of IWUA

Session Duration: The session will take two hours

No of participants: maximum of 30 - 40 participants per session

➤ Planning

- Prepare an annual/seasonal plan for water distribution

- Set up the objectives of the IWUA taking into account members needs and interests (or Social).
- Prepare annual/seasonal budgets
- Book keeping (accounting).
- Formulate strategies to reach the IWUA's objectives
- Prepare the annual/seasonal action plan for maintenance of infrastructures and equipment's
- Make sure that building material and spare parts for maintenance activities are available

➤ **Organizing**

- Train member in irrigation techniques
- Approve change of the IWUA service area
- Approve the reorganization or dissolution of the IWUA
- Implement the communication procedures within the IWUA

➤ **Directing**

- Recover irrigation fees and apply sanction for non or late payment
- Hire, supervise and pay IWUA employees (e.g technicians)
- Internal audit of the IWUA finance
- i. Approve contracts with external service providers
- ii. Any other activities assigned by the General Assembly or the Management Committee
- iii. Carry out routine, seasonal and emergency maintenance works
- iv. Prevent any unauthorised use and wastage of water;
- v. Make regular inventory and manage stocks of building material, machinery and spare parts, fuel.

➤ **Problem solving**

- Enforce IWUA by-laws and operational rules.
- Solve conflicts among IWUA and its members
- Arbitrate conflicts among IWUA members

➤ **Monitoring & Evaluation**

- Regular inspection of irrigation infrastructure and equipment (i.e. Pumps)

- Monitor maintenance activities
- If need be, monitor modernization or rehabilitation works and replacement of worn out equipment
- Monitor the implementation of the annual/seasonal water distribution plan
- Measure and monitor irrigation water use
- Prepare annual/seasonal activities report
- Adopt and use indicators for monitoring O&M
- Identify and mitigate the risk of damage to irrigation infrastructures and equipment
- Identify and mitigate the risk of soil erosion, soil salinity

ANNEX 1: TIMETABLE

Day 1.

No.	Time	Sessions	Trainer
1	8.30am - 9.00 am	Registration of participants	Secretary/ Coordinator
2	9.00 am -10.00am	Programme Opening and Climate Setting	Coordinator
	10.00 am - 10.30am	BREAK	
3	10.30 am -12.30 am	Introduction to leadership Concepts	Facilitator
4	12.30am- 1.00 pm	Discussions, Group Work	Facilitator
		LUNCH BREAK	
5	2.00 pm- 4.00 pm	IWUA Structures and Leadership Structures.	Facilitator

Day Two

No.	Time	Topic	Trainer
1	8.30am - 9.00 am	Registration of participants	Facilitator
2	9.00 am -9.30 am	Recap.	Facilitator
3	9.30 am – 11.30am	Potential Conflict Dimensions	
	11.30 am -12.00am	BREAK	
3	12.00 am - 1.00pm	Group discussion, role play	Facilitator
		LUNCH BREAK	
4	2.00 pm -3.00 pm	IWUA Leadership management functions	Facilitator
5	3.00pm - 4.00 pm	Summary/Action Plan /Evaluation /closing	Coordinator

Action Plan: Preparation of Conflict Resolution Policy, and committee Review of By Laws and preparation of Leadership Policy.

3.0 MODULE III: FINANCIAL MANAGEMENT AND RECORD KEEPING

Broad Objective:

To sensitize participants on the importance of financial management, enhance their record keeping capacity and promote transparency and accountability in the management of an IWUA.

Specific objectives

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

- Understand what Financial Management and Record keeping entails.
- Understand the types of financial records, tools and processes involved in financial management
- Understand budgeting and budgeting processes
- Understand how to formulate IWUA Financial Management Regulations.
- Understand Auditing and Financial Reports
- Create awareness on the benefits of good financial management to an effective IWUA.

Training flow

- What Financial Management and Record keeping entails.
- The types of financial records, tools and processes involved in financial management
- Budgeting and budgeting processes
- Formulation IWUA financial Management Regulations.
- Auditing and Financial Reports

Methodology

- Lectures
- Group Activities
- Practical

Participants

- IWUA members and IWUA leaders (a class of 30 people)

Timing

- Three months after the formation of IWUAS

Training materials and requirements

- Stationery (Pens, Note pads, Flip charts, Tape)
- Projector
- Computer
- Accounting documents
- Training hall

3.1 SESSION ONE : Introduction to record keeping and financial management.

What is Financial Management? What is Record Keeping?

General Objective of the session

Participants to understand what Financial Management and Record keeping entails.

Specific Objectives of the session

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

- a. To define Financial Management and Record Keeping
- b. To explain the importance of financial management and Record keeping in the management of IWUAs.
- c. To explain the linkage between IWUA Bylaws and good Record keeping and financial management.
- d. Identify the sources of IWUA income.

Main content of the session

Financial Management and Record keeping, their importance in management of IWUAs.

Linkage between IWUA Bylaws and good Record keeping and financial management.

Sources of IWUA income.

Session Flow

- i. Definition of Financial Management and Record Keeping
- ii. Importance of financial management and Record keeping in the management of IWUAs
- iii. IWUA Bylaws and their linkage with good Record keeping and financial management
- iv. Sources of IWUA income

Methodology

- Lectures
- Group Activities

Time allocation for the session

2 (Two) hours

Resource material of the session

a. Definition of Financial Management and Record Keeping

Financial management refers to the **planning, directing, monitoring, organising, and controlling of the monetary resources of an organisation**. It involves the efficient and effective management of money (funds) in such a manner as to accomplish the objectives of the organization. Financial Management entails the processes and controls that assist an organisation with planning, and ultimately improving business performance.

A **record** is something that represents **proof of existence** and that can be used to recreate or prove state of existence, regardless of medium or characteristics. A record is either created or received by an organization in pursuance of or in compliance with legal obligations, or in the day to day transaction of business. Records can be either tangible objects, such as paper documents like **birth certificates, driver's licenses, and physical medical x-rays, or digital information, such as electronic office documents, data in application databases, web site content, and electronic mail (email)**. **Record Keeping** refers to the maintenance of a history of one's activities, such as financial dealings, by entering data in ledgers or journals, putting documents in files, etc.

RECORDS KEPT IN A STORE

b. Importance of Financial management and Record keeping in the management of IWUAs

(i) Importance of Record keeping in the management of IWUAs

Why is good recordkeeping important?

Information is a primary organizational asset that is needed now and into the future. Good recordkeeping underpins the provision of good business information.

Good recordkeeping helps in finding and sharing the information you need

A business relies on information. Without it, it cannot function. Good recordkeeping can help in finding the information you need. It promotes the creation of full and accurate records in the first place. It also involves storing and managing records appropriately so that the information will be available to you when you need it. It can also assist you to promote information sharing and collaboration.

Good recordkeeping results in information that can be trusted

Good recordkeeping enables you to trust the information you find. Thanks to proper recordkeeping processes, you can be confident that information has authenticity and integrity, that data is in context, that you will be able to understand past decisions and actions and that the information will withstand scrutiny as evidence.

Good recordkeeping helps in making sound decisions

If you can access and trust information then you can use it to make more informed decisions and to take appropriate actions. Good recordkeeping helps you to conduct better business.

Good recordkeeping protects you and your organization from risk

Good recordkeeping can be your proof that you have made considered decisions and taken appropriate actions. Records become your protection if you are questioned or challenged. Without them, you are at risk.

Good recordkeeping can not only protect you but can support your organization in legal or other challenges. It also protects the rights of your clients and ensures that they have what they are entitled to. Without records, your organization and your clients are at risk.

Good recordkeeping can also help you to comply with a range of legislation and prevent legal challenges arising. It is a very powerful risk mitigation tool. It also ensures that records are destroyed in a timely way which again mitigates risk.

Good recordkeeping helps in meeting responsibilities for open government

Open government and the proactive release of information, needs to be supported by good recordkeeping. Good recordkeeping will help you to know what information you have and what you can make more openly available.

Good recordkeeping enables information to be reused

Business information that can be found easily and trusted can be repurposed and reused in multiple ways. This creates efficiencies and business advantages. It can

help you to maximize scarce resources.

Good recordkeeping can bring about commercial advantage

Good recordkeeping can bring enormous competitive advantages and adds value to your business. For example, information can be repackaged for business intelligence in innovative ways.

Good recordkeeping can save money

Good recordkeeping also helps you to routinely save time expired in business information retrieval and therefore save money.

Good recordkeeping helps to build better business systems

Good recordkeeping involves the proactive identification of information requirements and the configuration of business systems to meet these requirements. Such work can guarantee that the business information can be accessed, used and understood for as long as the business requires it, beyond the life-span of individual business applications.

Good recordkeeping supports long term accountability and sustainability

Good recordkeeping doesn't only support your business now. It also supports it in the future.

With the challenges of media degradation, rapid technological change and the barrage of new formats and applications lacking inherent recordkeeping capability, this task is not easy and requires planning and vigilance.

Some government business information will continue to be needed for a long time into the future. For example:

- Information that documents the rights and entitlements of staff and clients will be needed to ensure rights and entitlements are honoured now and in the future
- Information about the expenditure of major public funds or the decision making process for major policy developments will continue to be needed by organizations to demonstrate their accountability
- Information about the construction of bridges, roads and other public infrastructure will be needed to manage those assets in the future
- Key information will continue to be needed to document the rich history of an organization.

Good recordkeeping ensures that longer term needs for information are identified at creation and that the right information is sustained and remains accessible for as long as it is needed.

(ii) Importance of Financial management in the management of IWUAs

The IWUA is an organisation and good financial management can mean the difference between an organisation that grows and is ahead of the market, and one that falls at the first hurdle.

Financial management of an organization encompasses more than keeping an accurate set of books and balancing the organization's books of account. You must manage your finances to avoid overspending and also remain prepared for all expenditures. Your financial management

responsibilities affect all aspects of your business. An organization that does well in every other aspect but has poor financial management can fail.

Group Activity 1- Identify the sources of IWUA income and Discuss roles and responsibilities of office bearers in relation to record keeping and financial management.

Step 1

The participants form 3 groups

Step 2 (30 minutes)

Group 1 Task- Discuss definition of income and identify the sources of income within their area of operation.

Group 2 Task- Discuss roles and responsibilities of office bearers in relation to record keeping

Group 3 Task - Discuss roles and responsibilities of office bearers in relation to financial management.

Step 3

The group members choose a group leader and organise themselves to start the discussions.

Step 4

The group leaders present their work to plenary. (10 minutes)

Step 5

The facilitator wraps up and summarizes the session (5 minutes)

**The participants will be able to understand that the IWUA as an organisation must fund, run itself and be self-financing. They will also be able to understand that the estimated recurrent expenditure ought to be covered by the expected income.*

The participants will be able to understand the roles and responsibilities of office bearers as per the set IWUA Bylaws in relation to good record keeping and financial management.

What is 'Income'

Income is money that an individual or business receives in exchange for providing a good or service or through investing capital. Income is consumed to fuel day-to-day expenditures. It is good practice to match income with projected expenditure.

3.2 SESSION TWO: Financial Records, Tools and Processes

General Objective of the session

The participants to understand the types of financial records, tools and processes involved in financial management.

Specific Objectives of the session

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

- a. Identify types of financial records, tools and processes involved in Financial Management.
- b. Explain the following aspects of Financial Management and Record Keeping:
 - Basic Book keeping (Cash book).
 - Asset Register.
 - Member Cards.
 - Store Records.

Main content of the session

Financial records, tools and processes involved in Financial Management.

Aspects of Financial Management and Record Keeping in an IWUA

Session Flow

- i. Identification of types of financial records, tools and processes involved in Financial Management.
- ii. Explain the following aspects of Financial Management and Record Keeping:
 - Basic Book keeping (Cash book).
 - Asset Register.
 - Member Cards.
 - Store Records.

Methodology

- Lectures
- Group Activities

Time allocation for the session

2 (Two) hours

Resource material of the session

This is intended to be an awareness creation session on the need to keep all the financial records and carry out regular monitoring for effective accountability and transparency in the IWUA. Annex I (Examples of financial transactions) to be used in practical sessions on financial accounting and record keeping.

a. Financial records, tools and processes involved in Financial Management

Money management requires tracking movement of funds through budgeting, bookkeeping, financial accounting and auditing.

What is bookkeeping?

Bookkeeping involves the recording, storing and retrieving of financial transactions for an organization, individual, etc.

Common financial transactions and tasks that are involved in bookkeeping include:

- Billing for goods sold or services provided to clients.
- Recording receipts from customers.
- Verifying and recording invoices from suppliers.
- Paying suppliers.
- Processing employees' pay and the related governmental reports.
- Monitoring individual [accounts receivable](#) and [accounts payable](#).
- Recording [depreciation](#) and other adjusting entries.
- Providing [financial reports](#).

Bookkeeping requires knowledge of debits and credits (from books of original entry) and a basic understanding of financial accounting, which includes the balance sheet and income statement.

The financial records are found in book / ledgers as follows;

1. Receipt Book - used to record all moneys coming to the IWUA
2. Assets Book - used to record all assets owned by the IWUA
3. Order Book - used to place procurement orders to suppliers
4. Invoice Book - used to demand payments from customers
5. Goods Received Note - used to record all goods and materials received by the IWUA from suppliers
6. Payment Voucher Book - used to record all payments made out of the IWUA incomes
7. Debit Note Book - used to record all outstanding debts
8. Credit Note Book - used to record all outstanding payments
9. Bank Statement - issued by the bank indicating all transaction in the bank account for a specific period.

LOWER NZOIA IRRIGATION WATER USERS ASSOCIATION			
Address			
Bill To _____			
Address _____			
INVOICE No. _____			
Date _____			
Due Date _____			
Description	Quantity	Unit Price	Amount
		Total Due	

INVOICE

RECEIPTS

GOODS RECEIVED NOTE

What is **Financial Accounting**?

Financial accounting (FA) is the field of **accounting** concerned with the summary, analysis and reporting of financial transactions pertaining to a business. This involves the preparation of **financial statements** available for public consumption. **The organisation's management, employees, suppliers, lenders, banks, government agencies e.g tax authorities and other stakeholders** are examples of people interested in receiving such information for decision making purposes. The purpose of FA is to provide financial information about the reporting entity that is useful to existing and potential investors, lenders and other creditors in making decisions about providing resources to the entity.

It encompasses the entire **system** of **monitoring** and **control** of money as it flows in and out of an organization as **assets** and **liabilities**, and **revenues** and **expenses**.

It gathers and summarizes financial data to **prepare financial reports** such as **balance sheet** and **income statement**.

Financial accountancy is governed by both local and international accounting standards.

What is **Auditing**?

Auditing in financial management context refers to a systematic and independent examination of books, accounts, documents and vouchers of an organization to ascertain how far the financial statements present a true and fair view of the organization. It also attempts to ensure that the books of accounts are properly maintained by the organization as required by law. The auditor perceives and recognizes the propositions before him/her for examination, obtains evidence, evaluates the same and formulates an opinion on the basis of his judgement which is communicated through his audit report.

Audits provide third party assurance to various **stakeholders** that the subject matter is free from **material** misstatement. The term is most frequently applied to audits of the financial information relating to an organisation. Other areas which are commonly audited include: internal controls, quality management, project management, water management, and energy conservation.

As a result of an audit, stakeholders may effectively evaluate and improve the effectiveness of risk management, control, and the governance process over the subject matter.

b. To explain the following aspects of Financial Management and Record Keeping:

A FAR must be kept in order to be in compliance with legislation governing organizations, corporations, companies, etc.

It allows a company to keep track of details of each fixed asset, ensuring control and preventing misappropriation of assets. It also keeps track of the correct value of assets, which allows for computation of depreciation and for tax and insurance purposes. The FAR generates accurate, complete, and customized reports that suits the needs of management.

Member Cards

An IWUA being an organisation that provides a service to its customers (IWUA members), must maintain Customer Accounts to which funds can be lodged and fees charged, each time these transactions take place. This promotes transparency and accountability on the part of the organisation's leaders.

This session is intended to discuss with participants on the details likely to appear on the Member/Customer card. (20 minutes)

Store Records

Store is a place where excess material is kept which will be used as and when required. In the chain of internal customers and suppliers, stores has several internal customers. As a matter of fact all functions of management are internal customers to stores. Customers as usual expect Quality Cost and Delivery from every supplier. Stores also have to deliver these customer expectations. In the process of discharging this obligation Stores perform some activities that are functions of Stores.

Store management is “to receive materials, to protect them while in storage from damage & unauthorized removal, to issue the material in the right quantities, at the right time to the right place and to provide these service promptly and at least cost”.

Functions of Stores

1. Receipt
2. Storage
3. Retrieval
4. Issue
5. Records
6. Housekeeping

7. Control
8. Surplus management
9. Verification
10. Interaction & coordination

Objectives of Stores

1. Minimizing cost of production through minimizing cost on materials
2. Maintaining the value of materials
3. Protection against Loss of items, deterioration, obsolescence and inadequacy [of what is stored to what is needed]
4. Service to user departments
5. Establishing Co-ordination with other departments and
6. Advising materials Manager or Management

Store Records

Receipt

Any item of goods or material that enters the organization always enters through the stores. Similarly, every item unless specifically excluded, has to leave through the store. Stores is the final account keeper of all materials. Material sent by any supplier after the security clearance comes to the stores. Stores check the document carried by the carrier, known as Delivery Note, against the copy of the Purchase Order placed on the supplier by the organization.

Once the adequacy and quality is established, quantity is verified then the material receipt acknowledgement is. If the material is rejected it is sent back to the supplier after clear documentation is done.

Storage

Once the unloaded material is approved for storage, it is moved to a specific place in the stores layout. The material is so stored that it becomes easy to retrieve and issue subsequently. Storage should also ensure protection against deterioration, damage and pilferage.

A detailed system should be adopted for location and labeling of items while in storage. Storage plan should be made keeping in mind;

1. Nature of the product - physical state, toxicity, inflammability and other hazards
2. Volume and weight - heavy or light
3. Movement frequency- fast moving or slow moving

4. Point of use

Retrieval

Easy and quick retrievability of items that are demanded by the internal customers. Easy identification, maximum space utilization and minimum handling are key factors to retrieval functions. It is common knowledge in many of the companies that after hours of searching for the item is declared to be out of stock. This causes hold up of production process and avoidable urgent purchase of out of stock material. This function takes place as per established retrieval system.

Issue

Fulfilling customer demand for the item in minimum time, keeping quality high and cost minimum is important. An internal customer doesn't pay the price but he has to fulfill requirement of authorization for the demand. A duly authorized indent or requisition for the item is the key. All issues must be properly documented.

Records

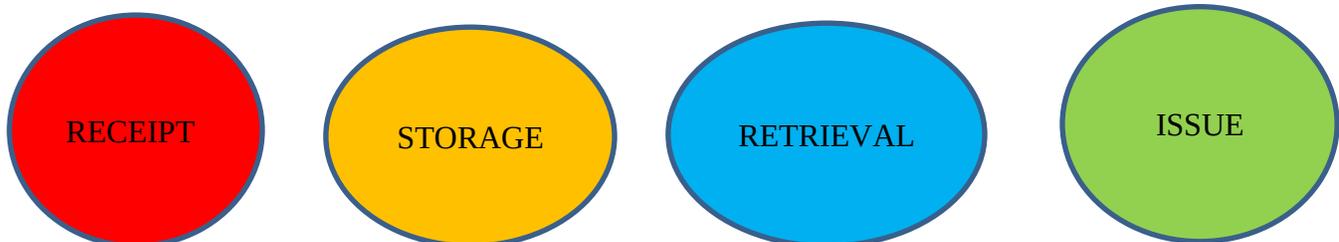
Maintaining records of receipt and issue is key in store management. Updating the stock levels as per movement of materials must be done promptly. Basic records of store are bin card and stock register, the Bin card is placed on the bin in which items are stored. This gives information about receipt, issue and balance. The stock register gives all the information in the bin card and also the value. These records are important in Stock verification to eliminate gap between information and physical stock, planning, forecasting and purchasing. Stores trigger the procurement cycle for items when a predetermined reorder level is reached, hence correct stock position through verification is critical to ensure 'no shortage and no excess' for the item.

Store Systems

Closed door system: the stored material is held under lock and key. Entry into the store is restricted authorized persons only. Physical movement of the material is only with authorized documents only. Maximum security and tight control on movement are features of this system.

Open stores system: In this system material is stored near point of use and there is restriction on consumption. Control passes on to the operations department.

STORAGE PROCESS



Group Activity 2- Stores Management (45 minutes)

Participants should discuss the challenges (real & potential) of stores management in their scheme and the store system in place with focus on the inherent challenges.

Step 1

The participants form 2 groups

Step 2(30 minutes)

Group 1 Task- Discuss the challenges of stores management in the irrigation scheme and prescribe possible solutions to those challenges.

Group 2 Task - Discuss the challenges of stores system in use in the irrigation scheme and prescribe possible solutions to those challenges.

Step 3

The group members choose a group leader and organise themselves to start the discussions.

Step 4

The group leaders present their work to plenary.(10 minutes)

Step 5

The facilitator wraps up and summarizes the session (5 minutes)

3.3 SESSION THREE: Budgeting and budgeting processes

General Objective of the session

Participants to understand budgeting and budgeting processes

Specific Objectives of the session

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

- a. Define budget and appreciate its importance.
- b. Describe and explain budgeting process.
- c. Demonstrate ability to prepare an IWUA budget.

Main content of the session

Budgeting, budget preparation process, its importance in IWUA financial management.

Session Flow

- i. Definition of a budget and appreciation of its importance.

- ii. Description and explanation of the budgeting process.
- iii. Demonstration by participants of ability to prepare an IWUA budget.

Methodology

- Lectures
- Group Activity

Time allocation for the session

2 (Two) hours

Resource material of the session

a. Definition of budget and its importance

A budget is an estimate, often itemized, of expected income and expenses for a given period in the future. The plan shows how much money a person or organization will earn and how much they will need or be able to spend.

Creating this spending plan allows one to determine in advance whether there will be enough money to do the things planned for the future.

Money is a scarce resource and if there isn't enough money to do everything one would like to do, then this planning process can be used to prioritize spending and focus the available money on the things that are most important.

What is [budgeting](#)?

Budgeting is the process for allocating financial resources and spending, while ensuring that you're spending less than you're bringing in (income) and planning for both the short- and long-term.

It's a proactive approach, rather than a reactive approach, to managing your money.

Budgeting is an important component of financial success. Budgeting makes it easier for people with [incomes](#) and [expenses](#) of all sizes to make conscious decisions about how they'd prefer to allocate their money.

Having a solid budget in place, knowing how much money is available and knowing exactly where that money is going makes it easier for one to manage money better and improve their financial situation.

It is prudent to set up a budget, update it as circumstances change, as well as get back on track if you go off your budget.

Importance of the Budget Process

Following a budget or spending plan will keep the organization out of debt or help the organization work its way out of debt if currently in debt.

In order to make effective decisions and coordinate the decisions and actions of the various departments, the organization needs to have a plan for sustainability. Typically an organization creates a budget annually which, once approved, becomes the Annual Plan (or Budget). The Budget serves several purposes:

- It is a means for management to gain consensus on how the year's resources are going to be allocated towards realization of the organization's quantifiable goals for the year.
- It is a goal setting exercise and monitoring tool.
- It provides a medium for assessing organization performance.
- It acts as an approval process.

To be effective, the budget process should have several key components: Clearly Defined Goals, Effective Communication, Management Involvement, Coordination, and Actual Performance Reporting.

Clearly Defined Goals

The Financial Goals of the organization need to be defined at the beginning of the process. The process of developing the goals begins with an analysis of the current year's performance and an understanding of what relationships exist to Revenue, fixed and variable.

Effective Communication

In order for the Management Team to be able to translate the Goals into an Operating Budget, effective communication is imperative. First, a timetable needs to be developed to set expectations and to determine deadlines. An organization meeting to communicate the process is desirable to ensure everyone receives the same message. A budget package is distributed to management with information to help develop budgets. The package should contain a rolling forecast updated with actuals, employee detail for headcount planning, the defined goals with specifics related to each department, a digital worksheet to aid both the development of the

budget and any upload or consolidation process, and a financial calendar which includes deadlines and responsibilities.

Management Involvement

For the process to be effective, Management buy-in is essential both in the planning process and during the year to monitor and manage actual performance. One purpose of the budgeting exercise is to achieve consensus by everyone even though they are all competing for the same resources. It is not possible for everyone to be able to add all the headcount they desire or spend the amount of money they would prefer. In addition, each department has a different perspective on what is necessary to achieve the organization's goals and the importance of their contribution. By the end of the process, everyone will have had to compromise and should understand where their interests all intersect with the organization's goals.

Coordination

Someone needs to be in charge of the process and drive towards the deadlines. It is common for it to fall within the chief Financial Officer's responsibilities. Preparing the information for goal setting, creating the worksheets, consolidating the information and being available to facilitate the process are all responsibilities of this position.

Actual Performance Reporting

Important to the effectiveness of the process is regular comparison of actual performance to the budget. In addition to the inclusion of budgets in the financial statement comparisons, many decisions should be made with the budget in mind. For example, headcount additions and fixed asset acquisitions should be evaluated if they were not budgeted expenses. Many organizations allow expenditures that were approved in the budget process but require extensive justification if they were not.

Done well, the budget process is an invaluable tool for an organization to monitor and achieve profitability.

b. The budgeting process

Having a formal and structured budgeting process is the foundation for good business management, growth and development. Discipline and planning should be the cornerstone of a business budgeting process.

As with most things that come with managing an organization, budgeting needs to be driven by the vision (what we are trying to accomplish) and the strategic plan (the steps to get there).

Organizations that stay focused on their strategy and plan know exactly where they want to spend their resources and have a plan to help keep them from spending money in areas that do not line up with the vision (what we are trying to do) and mission (why we are doing it).

Group Activity 3- Budget and Budget Preparation

Step 1

The participants form 3 groups

Step 2(30 minutes)

All groups to prepare an IWUA budget distinguishing recurrent and investment/capital expenditure.

Step 3

The group members choose a group leader and organise themselves to start the discussions.

Step 4

The group leaders present their work to plenary.(10 minutes)

Step 5

The facilitator wraps up and summarizes the session (5 minutes)

3.4 SESSION FOUR: Financial Management Regulations' Formulation.

General Objective of the session

Participants to understand how to formulate a financial management regulations document for their IWUA.

Specific Objectives of the session

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

- a. Define Financial Management regulations
- b. Discuss Financial Regulations formulation procedures.
- c. Demonstrate ability to Formulate Regulations governing Financial Management of the IWUA (Sources of finance, Water Rates Collection mechanisms, Financial Reporting and Frequencies etc....)

Main content of the session

Financial Management Regulations and their formulation procedures.

Session Flow

- i. Definition of Financial Management Regulations.

- ii. Financial Management Regulations formulation procedures.
- iii. Demonstration by participants of ability to prepare an IWUA Financial Management Regulations document.

Methodology

- Lectures
- Group Discussions and Activity

Time allocation for the session

2 (Two) hours for lecture and later 1 (One) hour for group activity and another 1 (One) hour of plenary discussions after lunch break.

Resource material of the session

a. Definition of Financial Management regulations

A Financial Management regulation refers to a documented set of broad guidelines, formulated after an analysis of all internal and external factors that can affect an organisation's objectives, operations, and plans. This set of basic principles and associated guidelines, formulated and enforced by the governing body of the organisation, is meant to direct and limit its actions in pursuit of long-term goals.

Financial management is an essential part of organisational management and cannot be seen as a separate task to be left to finance staff or the treasurer. Financial management involves planning, organising, controlling and monitoring financial resources in order to achieve organisational objectives and involves a range of financial tactics.

Effective financial management can only be achieved if there exists a sound organisational plan. A plan in this context means having set objectives and having agreed, developed and evaluated the policies, strategies, tactics and actions to achieve these objectives.

Underpinning all financial management systems is a series of financial policies and procedures which guide operations and lay out how an organisation uses and manages its money. A financial procedures manual brings all these together in one document. It helps to establish financial controls within the organisation that ensure accuracy, timeliness and completeness of financial data. The manual is generally used by finance staff, but it can also act as a reference for board members, managers and other staff.

A good financial management regulations will help the organisation to:

- make effective and efficient use of resources
- achieve objectives and fulfil commitments to stakeholders
- become more accountable to donors, funders and other stakeholders
- gain the respect and confidence of funding agencies, partners and beneficiaries
- gain advantage in competition for increasingly scarce resources
- prepare for long-term financial sustainability
- diversify income and manage risk

b. Discuss Financial Regulations formulation procedures

Defining good regulations

A good regulation:

- Is easily understood,
- has a definite purpose for its creation and is linked to the IWUA strategy
- is flexible, can adapt to change and is suited to the culture of the IWUA
- is developed through the involvement of management and interested stakeholders of the IWUA
- is communicated to all relevant people.

Financial Regulations' checklist

The regulations and procedures should start with the executive committees' financial responsibilities and its governance model/style. The following areas are some of those that would benefit from written policies and be included in a financial management manual for the IWUA:

- Board Members financial responsibilities
- Controls on Expenditure- who can spend what and with whose authority.
- Controls on Income
- Controls on Financial Accounting - for example, who records cheques received and who banks them.
- Exercising Budgetary Control - who can spend how much and on what and what expenditure needs special authorisation.
- Controls on Human Resources - who can recruit and for what roles, what permissions are needed and who authorizes pay grades/scales.
- Controls on Physical Assets - for example, who can authorize the sale, purchase and lease of buildings or equipment.

c. Demonstrate ability to Formulate Regulations governing Financial Management of the IWUAs (Sources of finance, Water Rates Collection mechanisms, Financial Reporting and Frequencies etc....)

Group Activity 4- Financial Management Regulations in line with the existing IWUA Bylaws

Step 1

The participants form 3 groups

Step 2(40 minutes)

All groups to prepare regulations and procedures in relation to financial and general administrative matters specific to their IWUA

Step 3

The group members choose a group leader and organise themselves to start the discussions.

Step 4

The group leaders present their work to plenary.(10 minutes)

Step 5

The facilitator wraps up and summarizes the session (5 minutes)

3.5 SESSION FIVE: Auditing and Financial Reports

General Objective of the session

Participants to understand Auditing and Financial Reports

Specific Objectives of the session

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

- a. Define Financial Audit and Reports; and their Importance
- b. Understand process of Financial Auditing and Reporting.
- c. Demonstrate the ability to perform Financial Audits and Reporting.

Main content of the session

Financial auditing and reporting.

Session Flow

- i. Definition of Financial Audits and Reports.
- ii. Explaining the process of Financial Auditing and Reporting.
- iii. Demonstration by participants of ability to perform Financial Audits and Reporting.

Methodology

- Lectures
- Group Discussions and Activity

Time allocation for the session

2 (Two) hours for lecture and later 1 (One) hour for group activity and another 1 (One) hour of plenary discussions before lunch break.

Resource material of the session

a. Definition of Financial Audit and Reports; and their Importance

A financial audit is an independent, objective evaluation of an organisation's financial reports and financial reporting processes which aims at giving regulators, investors, directors, and managers, reasonable assurance that financial statements are accurate and complete. The purpose of an audit is to provide an objective independent examination of the financial statements, which increases the value and credibility of the financial statements produced by

management, thus increase user confidence in the financial statements, reduce investor risk and consequently reduce the cost of capital.

The internal audit function plays a unique role in corporate governance by monitoring organizational risks and ensuring that organizational processes are efficient and effectively controlled and in line with the existing financial management regulations and accounting standards.

The Importance of Financial Audit and Reports to an IWUA

Auditing is a means of evaluating the effectiveness of the organisation's internal controls. Maintaining an effective system of internal controls is vital for achieving the organisation's business objectives, obtaining reliable financial reporting on its operations, preventing fraud and misappropriation of its assets, and minimizing its cost of capital. Both internal and independent auditors contribute to the organisation's audit system in different but important ways.

Business Objectives

Having an effective audit system is important for the organisation because it enables it to pursue and attain its various corporate objectives. Business processes need various forms of internal control to facilitate supervision and monitoring, prevent and detect irregular transactions, measure ongoing performance, maintain adequate business records and to promote operational productivity. Auditors review the design of the internal controls and informally propose improvements, and document any material irregularities to enable further investigation by management if it is warranted under the circumstances.

Risk of Misstatement

Auditors assess the risk of material misstatement in the organisation's financial reports. Without a system of internal controls or an audit system, the organisation would not be able to create reliable financial reports for internal or external purposes. Thus, it would not be able to determine how to allocate its resources and would be unable to know which of its segments are engaged in wasteful spending. Additionally, an audit system is crucial in preventing misstatements in an organisation's records and reports.

Fraud Prevention

Internal audit serves an important role for organisations in fraud prevention. Recurring analysis of the organisation's operations and maintaining rigorous systems of internal controls can prevent and detect various forms of fraud and other accounting irregularities. An important part of prevention can be deterrence, and if the organisation is known to have an active and diligent audit system in place, by reputation alone it may prevent an employee or vendor from attempting a scheme to defraud the organisation.

Cost of Capital

The cost of capital is important for every organisation, regardless of its size. Cost of capital is largely comprised of the risk associated with an investment, and if an investment has more risk, the IWUA will require a higher rate of return to invest. Strong audit systems can reduce various forms of risk in an enterprise, including its information risk (the risk of material misstatement in financial reporting), the risk of fraud and misappropriation of assets, as well as the risk of suboptimal management due to insufficient information on its operations.

b. Understand process of Financial Auditing and Reporting

Auditors perform the role of assessing the accuracy of financial reporting. The auditors are tasked with auditing the accounting, financial statements and governance of the organisation in order to obtain assurance that the organisation and its administrative bodies act in compliance with applicable laws and that the financial statements have been prepared in compliance with the policies, rules and regulations in force and give owners and other stakeholders a true and fair view of the financial performance and the financial position of the organisation.

A Financial Supervisory committee ought to be constituted to perform regular and periodic inspections and also oversee the financial reporting process and its effectiveness and ultimately report to full executive committee at meetings.

In the process of auditing, the Auditor also assesses, when applicable, the effectiveness and adequacy of financial reporting, and reports these audits to the executive management Committee.

c. Demonstrate the ability to perform Financial Audits and Reporting

Group Activity 5- Financial Reports and Auditing

Step 1

The participants form 3 groups

Step 2(40 minutes)

All groups to examine the excerpt provided by the facilitator and demonstrate the ability to perform Financial Audits and Reporting

Step 3

The group members choose a group leader and organise themselves to start the discussions.

Step 4

The group leaders present their work to plenary. (10 minutes)

Step 5 The facilitator wraps up and summarizes the session (5 minutes)

ANNEX 1.TIMETABLE

DAY ONE		
TIME	TOPIC	FACILITATOR
8.15 A.M -9.00 A.M	<ul style="list-style-type: none"> • Arrival and registration • Climate setting • Opening remarks (CDA) 	IWUA Chairman
9.00 A.M- 11.00 A.M	Introduction to record keeping and financial management	Facilitator
11.00 A.M-11.30 A.M	Tea break	
11.30 A.M- 1.30 P.M	Financial Records, Tools and Processes	Facilitator
1.30 P.M-2.30 P.M	Lunch break	
2.30 P.M -4.30 P.M	Budgeting and budgeting processes	Facilitator
4.30 P.M	Tea break and departure	
DAY TWO		
8.30 A.M-9.00 A.M	Recap	Facilitator
9.00 A.M-11.00 A.M	Group discussion, making of an IWUA budget and plenary	Facilitator
11.00 A.M -11.30 A.M	Tea break	
11.30 A.M- 1.30 P.M	Formulation of IWUA financial Management regulations.	Facilitator
1.30 P.M-2.30 P.M	Lunch break	
2.30 P.M -4.30 P.M	Group discussion on regulations' formulation and plenary discussion	Facilitator
4.30 P.M	Tea break and departure	

DAY THREE		
8.30 A.M-9.00 A.M	Recap	
9.00 A.M – 11.00 A.M	Auditing and Financial Reports	Facilitator
11.00 A.M-11.30 A.M	Tea break	
11.30 .M -1.30 P.M	Group work on Financial Audits, Reporting and Plenary discussion	Facilitator
1.30 P.M- 2.30 P.M	Lunch break	
2.30 P.M- 3.00 P.M	Post session knowledge evaluation	Facilitator
3.00 P.M- 3.30 P .M	Training evaluation	Facilitator
3.30 P.M- 4.00 P.M	Action plan	Facilitator
4.00 P.M	Closing Remarks (AC)	

BROAD OBJECTIVE

To impart on the participants efficient and effective water management techniques for optimal crop production.

SPECIFIC OBJECTIVE:

- To understand the aspects of on-farm irrigation water management
- To understand the soil-crop water relationships
- To understand crop water requirements
- To understand different irrigation technologies
- To understand irrigation water supply chain

TRAINING FLOW:

1. Introduction to on-farm irrigation water management
2. Soil-crop water relationships
3. Crop water requirement
4. Introduction to various irrigation technologies
5. On-farm irrigation Water distribution
6. Irrigation water supply chain

4.1 SESSION 1 : INTRODUCTION TO ON-FARM WATER MANAGEMENT

GENERAL OBJECTIVE

At the end of the session the participants are expected to understand the aspects of on-farm irrigation water management

SPECIFIC OBJECTIVE

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

- Define on-farm irrigation water management
- Identify activities in on-farm irrigation water management
- Explain the importance on-farm irrigation water management
- Outline the challenges faced in on-farm irrigation water management

SESSION FLOW

- Group Activity
- Activities in on-farm water management
- Importance of on-farm water management
- Challenges faced in on-farm water management

TRAINING METHODOLOGY

- Lecture
- Group discussion

TARGET PARTICIPANTS

- IWUA leaders
- Farmers

TIMING

After completion of the irrigation & drainage infrastructure before cropping

TRAINING MATERIALS

- Visual Aids
- Flip charts, white boards &
- Marker & felt pens, masking tape
- Projector
- Laptops

MAIN CONTENT OF LESSON

GROUP ACTIVITY

PRESENTATION AND DISCUSSION OF FARMERS REPORT PREPARED ON THE FOLLOWING ASPECTS

1. Introduction of Lower Nzoia Irrigation Project, brief history on how irrigation came into practice in the community.
2. Traditional Irrigation practice in Lower Nzoia Irrigation Scheme.
3. Cropping enterprises there preference and factors influencing their selection.
4. Brief description of the kind of soils in Lower Nzoia and their geographical spread and possible description of physical properties
5. Description of Irrigation water application methods eg. bucket and reasons informing choice of method.
6. Description of seasonal cropping patterns in Lower Nzoia
7. Description of any value addition to produce that is carried out.
8. Challenges experienced in irrigation

ACTIVITIES IN ON-FARM WATER MANAGEMENT

What is irrigation?

Irrigation is the artificial application of water to the soil for purposes of crop production. Irrigation water supplements water available from rainfall and contribution to soil moisture from groundwater. Irrigation is achieved through the use of an **Irrigation System**.

What is an irrigation system

An irrigation system is composed of units(Structures) that through interactions deliver water from the **source** to **application points** for the purpose of crop production. Irrespective of the type, an irrigation system should guarantee the right amount of water at the point of application (field/farm).

Components of an irrigation system

Irrigation chain

- Intake works (eg. Pumping station, diversion weir)
 - Main canals
 - Secondary canals
 - Tertiary canals
 - Mini-feeders
 - Mini drains
 - Main drains
 - collector drains
- } (Conveyance system)
- } (Distribution system)

Importance of irrigation

- Food security/self sufficiency
- Income generation
- Employment creation
- Earning foreign exchange

What is on-farm irrigation water management

It is the act of **timing** and **regulating** Irrigation **water application** in a way to satisfy water requirements for crop growth without wasting water, soil and plant nutrients and degrading the water resource.

Principles of water management

- Irrigation water planning-cropping program (acres, distance, irrigation frequency,)
- Irrigation water scheduling-work targets
- Irrigation water control
- Irrigation water measurement
- Irrigation chain
- Gender and equity

Maintenance planning-factors considered

- Size of infrastructure
- Efficiency of infrastructure
- Machinery capacity
- Machinery efficiency
- Working state of infrastructure
- Availability of spares
- Availability of building materials

Irrigation water planning-factors considered

- Total Crop water requirement
- Infrastructure capacity
- Infrastructure efficiency
- Age of the crop

- Irrigation water supply

Irrigation water scheduling-factors considered

- Availability of water
- Acreage under crop
- Anticipated maintenance programs
- Working condition of infrastructure
- Lead time-(time taken to move the water from the inlet of the canal to the outlet of the canal)
- Others-no. of leaders, sick offs, weekends and public holidays

Infrastructure capacity & efficiency (to deliver required quantity of water to field fast)

Irrigation water control:

The aim of this is to guide water into command areas with minimum breaching of canal.

Structures used:

- **Weirs**-water diversion
- **Gates**-opening and closing (double and single orifice gates) can be sliding or rotating
- **Drops** –for dissipating energy to maintain a correct velocity
- **Division boxes and turn-out**- for directing water into command areas

Water control gates

Drops:

To dissipate energy of flowing water

Other structures used in water control.

- **Cross drainage**-used where we have canals crossing each other
- **Dykes** –acts as barrier to prevent water from going to unwanted areas especially in areas where the slopes are very low

- **Spill ways**-for conveying excess water in the canals to avoid flooding and damage of canal banks

Irrigation water measurement-to measure correct volume of water directed into command areas

Structures

- **Weirs**-for regulating defined volumes of water to command areas and also used to raise head for diversion of water
- **Staff gauge**-this is a sheet metal graduated into various readings used for calibration of water volumes in canals, drains, rivers
- **V-notch**-this a v-shaped structure graduated into various readings showing volumes of water at different levels

IMPORTANCE OF ON-FARM WATER MANAGEMENT

Water is a scarce valuable resource required for plant growth. On farm water management is important for the following reasons in an irrigation scheme:

- To ensure all farmers get water when they require it
- To avoid wastage of water by excess application
- Reducing the cost of irrigation/ cost of production
- Reducing water conflict between farmers

CHALLENGES FACED IN ON-FARM WATER MANAGEMENT

- Vandalism of irrigation and drainage infrastructure
- Default of the water use charges and O&M fees by some irrigators
- Low river flow leading to water shortage and water conflicts
- Breakdown of pumping stations and siltation of intakes
- Lack of adherence to the cropping program and water distribution schedule

4.2 SESSION 2: SOIL, CROP, WATER RELATIONSHIP

GENERAL OBJECTIVE

At the end of the session the participants are expected to understand the soil, crop water relationships

SPECIFIC OBJECTIVE

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

- Describe soil and its properties in relation to crop choice and irrigation
- Discuss soil-crop water relationships

SESSION FLOW

- Role of water and soil in plant growth
- Crop water use and evapotranspiration
- Explanation of the Soil, plant, water, air relationship
- Importance of the soil, plant, water, air relationship

TRAINING METHODOLOGY

- Lecture
- Group discussion

TARGET PARTICIPANTS

- IWUA leaders
- Farmers

TIMING

After completion of the irrigation & drainage infrastructure before cropping

TRAINING MATERIALS

- Visual Aids
- Flip charts, white boards &
- Marker & felt pens, masking tape
- Projector

- Laptops

MAIN CONTENT OF LESSON

ROLE OF WATER AND SOIL IN PLANT GROWTH

Role of water in plant growth

Field crops need water, air and light in order to grow

- Water is a medium of transporting nutrients from the plant roots to other parts of the plant
- Water helps the plant cells to remain turgid for the plant to remain upright.
- Water Helps in cooling the plant
- Water is a component in manufacturing plant material (food)through the process of photosynthesis

Role of soil in plant growth

- Anchorage for plants
- **Reservoir for Water and Nutrients**
- Medium of water and air circulation
- Influence plant water absorption rate
- Inter-relationship between soil pores and its water holding capacity
- Space for beneficiary micro-organisms

CROP WATER USE AND EVAPOTRANSPIRATION

Crop Water Use

In cropped field water can be lost through two processes. The processes are Evaporation and Transpiration.

Transpiration is the loss of liquid water contained in the plant tissues to the atmosphere from small openings on the leaf surface called stomata. Transpiration happens mainly during the day time.

Evaporation is the loss of liquid water to the atmosphere from the surface

Evapotranspiration is calculated in depth mm/day

EXPLANATION OF THE SOIL, PLANT, WATER, AIR RELATIONSHIP

Soil is made up of three parts:

- Air

- Water
- Solid

The solid part is made up of sand, silt, clay, organic matter and minerals.

The soil pores are occupied water & air

Water is lost in the soil through:

- Surface Run-off
- Evaporation
- Transpiration
- Percolation or seepage

IMPORTANCE OF THE SOIL, PLANT, WATER, AIR RELATIONSHIP

- Amount of water available in the soil at field capacity is determined by the soil texture,
- The soil texture will affect root depth of plant,
- The root distribution in the soil determines the uptake of water by the crop and affects degree of water stress tolerance,
- The soil factors will affect the choice of crop such as salt tolerant crops in salty soils,
- The soil factors will determine the degree of loss of water from the soil
- Irrigation scheduling to replace the lost water is determined by the soil, water crop relationships

4.3 SESSION 3: CROP WATER REQUIREMENTS

GENERAL OBJECTIVE

At the end of the session the participants are expected to understand crop water requirements

SPECIFIC OBJECTIVES

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

- Define crop water requirements
- Discuss factors determining crop water requirements
- Describe determination of irrigation water requirements

SESSION FLOW

- Definition of crop water requirement
- Factors determining crop water requirement
- Determination of irrigation water requirement and irrigation schedule
- Checking adequacy of irrigation

TRAINING METHODOLOGY

- Lecture
- Demonstration
- Group discussion

TARGET PARTICIPANTS

- IWUA leaders
- Farmers

TIMING

After completion of the irrigation & drainage infrastructure before cropping

TRAINING MATERIALS

- Visual Aids
- Flip charts, white boards &
- Marker & felt pens, masking tape
- Projector
- Laptops

MAIN CONTENT OF LESSON

DEFINITION OF CROP WATER REQUIREMENT

Crop water requirement is defined as the quantity of water required by a crop in a given period of time for normal growth under field conditions. It includes evaporation, transpiration and other unavoidable wastes.

It is expressed in water depth per unit area or expressed as depth (mm/day)

FACTORS DETERMINING CROP WATER REQUIREMENT

1. Climate.

A certain crop grown in a sunny and hot climate needs more water per day than the same crop grown in cloudy and cooler climate. Climatic factors that influence crop water needed include humidity, sunshine, temperature and wind speed.

Climatic factor	Crop water needed	
	high	low
Sunshine	Sunny (no clouds)	Cloudy (no sun)
Temperature	Hot	Cool
Humidity	Low (dry)	High (humid)
Wind speed	windy	Little wind

2. Type of crop

Different crops require different amount of water for maturity. The crop type on crop water need is influenced by;

The crop type: crops like rice or sugarcane need more water than crops like beans or wheat.

The growth stage of the crop: fully grown crops need more water than newly planted crops.

3. Irrigation intensity

Irrigation intensity is directly related to water requirement, the more the intensity the greater the water required for a particular crop.

4. Conveyance losses

This is experienced from the barrage to the field; therefore, design should cater for the crop water requirement plus water losses. Water losses in an irrigation channel are due to absorption, seepage or percolation and evaporation. The absorption losses are due to the type of soil, subsoil water, age of canal, amount of silt carried by canal and wetted perimeter.

5. Method of water application

In sprinkler method, less water is required as it just moist the soil like rainwater whereas in flood more water is required.

6. Delta of crop

This refers to the total amount of water required for maturing a crop.

DETERMINATION OF IRRIGATION WATER REQUIREMENT & IRRIGATION SCHEDULE

Irrigation water requirement

Basically is a representation of the difference between the crop water requirement and effective precipitation. Moreover, irrigation water requirement includes additional water for leaching of salts and compensation of non-uniformity of water application.

Irrigation water refers to the water that must be supplied by the irrigation system to ensure the crop receives its full crop water requirement.

What is an irrigation schedule?

The planning tool used to determine when to apply irrigation water in the correct frequency and duration.

Factors to be considered when developing a workable irrigation schedule

- Soil properties
- Soil-water relationships
- Type of crop and its sensitivity to drought stress
- Stage of crop development
- Availability of a water supply
- Climatic factors such as rainfall and temperature.

Irrigation and crop water requirements

The crop water needs are supplied to a crop through three ways:

- By rainfall
- By irrigation
- By a combination of irrigation and rainfall

Irrigation need = Crop water need (ET Crop) - Effective rainfall (Pe)

Only water retained in the root zone can be used by crops. The soil in the root zone is the store for water. Excess water is lost through evaporation and deep percolation. Hence it is useless and wasteful to apply water beyond root zone.

How much water should we apply?

It is important only to apply the required water.

- Too little will lead to reduced yield
- Too much will cause water logging and loss of nutrients

Rule of thumb: Do not irrigate beyond the root zone

Methods of checking depth of water

- Observation hole
- Metal rod
- Feel method
- Soil probe

Checking adequacy of water application using physical appearance of crop

General indicators of water stress in crops are:

- Curling or wilting
- Darkening
- Lack of firmness of young leaves
- Considerable slowing of plant growth
- Changes in leaf orientation due to water scarcity

Irrigation scheduling

Irrigation schedule is a time table showing:

The date and time individual farmers may irrigate throughout the season:

It is based on:

- The irrigation interval (number of days between two consecutive irrigations)
- The application duration of each irrigation gift (depth of application)

The application duration depends on:

Irrigation interval

Two factors are considered in calculation of the irrigation interval:

- The crop water use (mm/day)
- The water storage in the soil (mm)

The crop water use will depend on several factors expressed as (ET Crop)

The water storage in soil will depend on type of soil and rooting depth of crop.

The irrigation interval is calculated as the water storage in the soil divided by the crop water use per day. It is expressed in Days.

Water storage capacity for differed soil types:

SOIL TYPE	WATER STORAGE CAPACITY (mm/10cm)
Clay	14-19
Clay loams	16-22
Loams	14-19
Sandy loam	9-15
Sand	6-10

Importance of irrigation scheduling

- Over irrigation can be avoided
- Water saving can be realized
- Stress on the plants can be reduced
- Crops yields can be boosted

Review of session objectives

At the end of the session the participants are expected to be able to:

1. Define crop water requirements
2. Outline factors of crop water requirements
3. Discuss crop water requirements in relation to crop growth stages for specific crop enterprises
4. Discuss irrigation in relation to Crop Water Requirement (CWR)

4.4 SESSION 4: INTRODUCTION TO VARIOUS IRRIGATION TECHNOLOGIES

GENERAL OBJECTIVE

At the end of the session, the participants are expected to understand different irrigation technologies

SPECIFIC OBJECTIVES

By being able to:

- Discuss the different irrigation technologies
- Describe the selection criteria for suitable irrigation technologies

SESSION FLOW

- Explanation of the different irrigation technologies
- Factors considered when selecting suitable irrigation technology

TRAINING METHODOLOGY

- Lecture
- Demonstration
- Group discussion

TARGET PARTICIPANTS

- IWUA leaders
- Farmers

TIMING

After completion of the irrigation & drainage infrastructure before cropping

TRAINING MATERIALS

- Visual Aids
- Flip charts, white boards &
- Marker & felt pens, masking tape
- Projector
- Laptops

MAIN CONTENT OF LESSON

EXPLANATION OF THE DIFFERENT IRRIGATION TECHNOLOGIES

What are the different irrigation technologies?

Irrigation technologies are various methods that can be incorporated by farmers for controlled application of water. For each selected method, there should be optimum use of available water.

Sprinkler irrigation

This is a method of applying irrigation water under pressure to the soil in the form of a thin spray from above. It mimics natural rainfall. Water can be sprayed over or under the crop canopy.

Sprinkler irrigation is adaptable to any farmable slope, whether uniform or undulating. It is best suited for most row, field and tree crops. Average application rate from the sprinklers should be less than basic infiltration rate of the soil also that surface runoff and ponding is avoided.

Water supplied for sprinkler irrigation should be free from suspended sediments to avoid sprinkler nozzle wearing, blockage and spoiling the crop by coating it with sediments.

Micro sprinkler irrigation of beans.

Drip irrigation

It involves delivering water at or near the root of the plant, drop after the other. The system consists of a network of pipes along with water filtration provisions and suitable emitting devices (Emitters). Drip irrigation is best suited for horticultural crops (high value vegetables and fruits).

It is characterized by

- Low flow rate.
- Long duration irrigation.
- Frequent irrigation.
- Water applied near or into plant's root zone.
- Low-pressure delivery systems.

Drip irrigation of tomatoes, a high value crop.

Border irrigation

Border irrigation is suited for crops that can withstand flooding for a short time.

Furrow irrigation

Consists of parallel channels (furrows) separated by slightly raised beds or ridges running at a slight gradient to allow slow flow of water and wetting of the soil. It reduces the area ponded or contacted by water hence reducing water used.



Basin irrigation by a variety of other names:

- Check flooding;
- Check irrigation;
- Check-basin irrigation;
- Level borders;
- Level-basin irrigation.

Basin irrigation is most effective on uniform soils, precisely levelled and where large stream sizes are available. The size of basin is limited by the available water (stream size), topography, soil factors and degree of levelling required.

Maize crop in basins.

FACTORS CONSIDERED WHEN SELECTING SUITABLE IRRIGATION TECHNOLOGY

Selection of suitable irrigation technologies

Farmers have a wide variety of irrigation technologies to explore depending on:

- Natural Conditions
- Type of crop grown
- Type of technology
- Previous experience with irrigation
- Required labour inputs
- Costs and benefits

1. Natural Conditions

The natural conditions such as soil type, slope, climate, water quality and availability, have the following impact on the choice of an irrigation method:

Soil type: Sandy soils have a low water storage capacity and a high infiltration rate. They therefore need frequent but small irrigation applications, in particular when the

sandy soil is also shallow. Under these circumstances, sprinkler or drip irrigation are more suitable than surface irrigation. On loam or clay soils all three irrigation methods can be used, but surface irrigation is more commonly found. Clay soils with low infiltration rates are ideally suited to surface irrigation.

When a variety of different soil types is found within one irrigation scheme, sprinkler or drip irrigation are recommended as they will ensure a more even water distribution.

Slope: Sprinkler or drip irrigation are preferred above surface irrigation on steeper or unevenly sloping lands as they require little or no land levelling. An exception is rice grown on terraces on sloping lands.

Climate: Strong wind can disturb the spraying of water from sprinklers. Under very windy conditions, drip or surface irrigation methods are preferred. In areas of supplementary irrigation, sprinkler or drip irrigation may be more suitable than surface irrigation because of their flexibility and adaptability to varying irrigation demands on the farm.

Water availability: Water application efficiency is generally higher with sprinkler and drip irrigation than surface irrigation and so these methods are preferred when water is in short supply. However, it must be remembered that efficiency is just as much a function of the irrigator as the method used.

Water quality: Surface irrigation is preferred if the irrigation water contains much sediment. The sediments may clog the drip or sprinkler irrigation systems.

If the irrigation water contains dissolved salts, drip irrigation is particularly suitable, as less water is applied to the soil than with surface methods.

Sprinkler systems are more efficient than surface irrigation methods in leaching out salts.

2. Type of crop

Surface irrigation can be used for all types of crops. Sprinkler and drip irrigation, because of their high capital investment per hectare, are mostly used for high value cash crops, such as vegetables and fruit trees. They are seldom used for the lower value staple crops.

Drip irrigation is suited to irrigating individual plants or trees or row crops such as vegetables and sugarcane. It is not suitable for close growing crops (e.g. rice).

3. Type of technology

The type of technology affects the choice of irrigation method. In general, drip and sprinkler irrigation are technically more complicated methods. The purchase of equipment requires high capital investment per hectare. To maintain the equipment a high level of 'know-how' has to be available. Also, a regular supply of fuel and spare parts must be maintained which - together with the purchase of equipment - may require foreign currency.

Surface irrigation systems - in particular small-scale schemes - usually require less sophisticated equipment for both construction and maintenance (unless pumps are used). The equipment needed is often easier to maintain and less dependent on the availability of foreign currency.

4. Previous experience with irrigation

The choice of an irrigation method also depends on the irrigation tradition within the region or country. Introducing a previously unknown method may lead to unexpected complications. It is not certain that the farmers will accept the new method. The servicing of the equipment may be problematic and the costs may be high compared to the benefits. Often it will be easier to improve the traditional irrigation method than to introduce a totally new method.

5. Required Labour Inputs

The required labour inputs for construction and maintenance depend heavily on the extent to which machinery is used.

In general it can be stated that to operate the system, basin irrigation requires the least labour and the least skill. For the operation of furrow and border irrigation systems more labour is required combined with more skill

6. Costs and Benefits

Before choosing an irrigation method, an estimate must be made of the costs and benefits of the available options. On the cost side not only the construction and installation, but also the operation and maintenance (per hectare) should be taken into account. These costs should then be compared with the expected benefits (yields). It is obvious that farmers will only be interested in implementing a certain method if they consider this economically attractive. Cost/benefit analysis is, however, beyond the scope of this manual.

4.5 SESSION 5: ON-FARM IRRIGATION WATER DISTRIBUTION

GENERAL OBJECTIVE

At the end of the session the participants are expected to understand on-farm irrigation water distribution

SPECIFIC OBJECTIVE

by being able to:

- Define on-farm irrigation water distribution
- Outline factors to consider in on-farm irrigation water distribution
- Demonstrate ability to carry out equitable on-farm irrigation water distribution
- Identify and list water control structures for different irrigation methods

SESSION FLOW

- Principles of on-farm water management
- Objectives of on-farm water management
- On-farm water management activities
- Review of session objectives

TRAINING METHODOLOGY

- Lecture
- Demonstration
- Group discussion

TARGET PARTICIPANTS

- IWUA leaders
- Farmers

TIMING

After completion of the irrigation & drainage infrastructure before cropping

TRAINING MATERIALS

- Visual Aids

- Flip charts, white boards &
- Marker & felt pens, masking tape
- Projector
- Laptops

MAIN CONTENT OF LESSON

PRINCIPLES OF ON FARM WATER MANAGEMENT

Apply Water

- According to crop needs
- In amounts that can be held in the soil and available to crops
- At rates consistent with intake characteristics of the soil and erosion hazard of the site
- Ensuring water quality is maintained or improved

OBJECTIVES OF ON FARM WATER DISTRIBUTION

1. Ensure water is delivered to the crop at the right time and in correct amounts
2. Prevent excessive use of water for irrigation
3. Prevent excessive soil erosion
4. Reduce labour
5. Maximise profits and minimize costs
6. Maintain or improve quality of ground water and downstream surface water
7. Increase crop yield and product quality

ON-FARM IRRIGATION WATER DISTRIBUTION ACTIVITIES

The following are on-farm water management activities:

1. Determination of Crop water requirements
2. Abstraction of the right amount of water from source and conveying it to the farm(field)
3. Preparation of the field for water application
4. Application of the right amount of water without causing soil erosion and leaching of nutrients, dependant on the crop growth stage.
5. Checking(Monitoring) the right amount of water is applied.(Irrigation gift)

6. Determination of the irrigation cycle

Crop Water Requirement

Crop water requirement is defined as the quantity of water required by a crop in a given period of time for normal growth under field conditions. It includes evaporation, transpiration and other unavoidable wastes.

It is expressed in water depth per unit area or expressed as depth (mm/day)

FACTORS DETERMINING CROP WATER REQUIREMENT

1. Climate.

A certain crop grown in a sunny and hot climate needs more water per day than the same crop grown in cloudy and cooler climate. Climatic factors that influence crop water needed include humidity, sunshine, temperature and wind speed.

Climatic factor	Crop water needed	
	high	low
Sunshine	Sunny (no clouds)	Cloudy (no sun)
Temperature	Hot	Cool
Humidity	Low (dry)	High (humid)
Wind speed	windy	Little wind

2. Type of crop

Different crops require different amount of water for maturity. The crop type on crop water need is influenced by;

The crop type: crops like rice or sugarcane need more water than crops like beans or wheat.

The growth stage of the crop: fully grown crops need more water than newly planted crops.

3. Irrigation intensity

Irrigation intensity is directly related to water requirement, the more the intensity the greater the water required for a particular crop.

4. Conveyance losses

This is experienced from the barrage to the field; therefore, design should cater for the crop water requirement plus water losses. Water losses in an irrigation channel are due to absorption,

seepage or percolation and evaporation. The absorption losses are due to the type of soil, subsoil water, age of canal, amount of silt carried by canal and wetted perimeter.

5. Method of water application

In sprinkler method, less water is required as it just moist the soil like rainwater whereas in flood more water is required.

6. Delta of crop

This refers to the total amount of water required for maturing a crop.

Determination of irrigation water requirement & irrigation schedule

Irrigation water requirement

Basically is a representation of the difference between the crop water requirement and effective precipitation. Moreover, irrigation water requirement includes additional water for leaching of salts and compensation of non-uniformity of water application.

Irrigation water refers to the water that must be supplied by the irrigation system to ensure the crop receives its full crop water requirement.

What is an irrigation schedule?

The planning tool used to determine when to apply irrigation water in the correct frequency and duration.

Factors to be considered when developing a workable irrigation schedule

- Soil properties
- Soil-water relationships
- Type of crop and its sensitivity to drought stress
- Stage of crop development
- Availability of a water supply
- Climatic factors such as rainfall and temperature.

Irrigation and crop water requirements

The crop water needs are supplied to a crop through three ways:

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- By a combination of irrigation and rainfall

Irrigation need = Crop water need (ET Crop) - Effective rainfall (Pe)

Only water retained in the root zone can be used by crops. The soil in the root zone is the store for water. Excess water is lost through evaporation and deep percolation. Hence it is useless and wasteful to apply water beyond root zone.

How much water should we apply?

It is important only to apply the required water.

- Too little will lead to reduced yield
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Rule of thumb: Do not irrigate beyond the root zone

Methods of checking depth of water

- Observation hole
- Metal rod
- Feel method
- Soil probe

Irrigation scheduling

Irrigation schedule is a time table showing:

The date and time individual farmers may irrigate throughout the season:

It is based on:

- The irrigation interval (number of days between two consecutive irrigations)
- The application duration of each irrigation gift (depth of application)

The application duration depends on:

Irrigation interval

Two factors are considered in calculation of the irrigation interval:

- The crop water use (mm/day)
- The water storage in the soil (mm)

The crop water use will depend on several factors expressed as (ET Crop)

The water storage in soil will depend on type of soil and rooting depth of crop.

The irrigation interval is calculated as the water storage in the soil divided by the crop water use per day. It is expressed in Days.

Water storage capacity for differed soil types:

SOIL TYPE	WATER STORAGE CAPACITY (mm/10cm)
Clay	14-19
Clay loams	16-22
Loams	14-19
Sandy loam	9-15
Sand	6-10

Irrigation infrastructure system components

REVIEW OF SESSION OBJECTIVES

At the end of the session the participants are expected to be able to:

- Discuss their current on-farm practices in respect to cropping enterprises, water systems and application methods, soil properties and cropping calendar with the aim of improving current practices.
- Explain on-farm water management in the context of Irrigated agriculture.
- Enumerate and explain activities constituting on-farm water management.
- Outline post-harvest activities in relation to Irrigated produce.

4.6 SESSION 6: IRRIGATION WATER SUPPLY CHAIN

GENERAL OBJECTIVE

At the end of the session the participants are expected to understand irrigation water supply chain

SPECIFIC OBJECTIVE

by being able to

- Describe the irrigation water supply chain
- Describe the water distributive roles of different actors along the irrigation water supply chain

SESSION FLOW

- Explanation of the irrigation water supply chain
- Irrigation infrastructure in the irrigation water supply chain
- Actors along the irrigation water supply chain in Kenya
- Group Activity

TRAINING METHODOLOGY

- Lecture
- Group discussion

TARGET PARTICIPANTS

- IWUA leaders
- Farmers

TIMING

After completion of the irrigation & drainage infrastructure before cropping

TRAINING MATERIALS

- Visual Aids
- Flip charts, white boards &
- Marker & felt pens, masking tape
- Projector
- Laptops

MAIN CONTENT OF LESSON

EXPLANATION OF THE IRRIGATION WATER SUPPLY CHAIN

What is the irrigation water supply chain

Irrigation water supply is the chain of activities involving different actors that results in conveyance of irrigation water from the source to the farmer field for crop uptake.

IRRIGATION INFRASTRUCTURE IN THE IRRIGATION WATER SUPPLY CHAIN

- **The (main) intake structure**, or (main) pumping station, directs water from the source of supply, such as a reservoir or a river, into the irrigation system.
- **The conveyance system** assures the transport of water from the main intake structure or main pumping station up to the field ditches.
- **The distribution system** assures the transport of water through field ditches to the irrigated fields.
- **The field application system** assures the transport of water within the fields.
- **The drainage system** removes the excess water (caused by rainfall and/or irrigation) from the fields.

ACTORS ALONG THE IRRIGATION WATER SUPPLY CHAIN IN KENYA

The following are the main actors along the irrigation water supply chain in Kenya.

Ministry of Water and Irrigation

- Policy direction
- Legislative framework
- Funding for irrigation development

Water Resources Management Authority (WRMA)

- Conserves and manages all water resources from which irrigation water is drawn
- Issues the water abstraction permit
- Levies the water use charges for the irrigation water abstracted
- Regulates the River Water Users Association (RWUA)

National Irrigation Board

- Development of irrigation and drainage infrastructure,
- Operation and maintenance of the major irrigation and drainage infrastructure such as intake works, main canals upon payment of O&M fees by the farmers,
- Capacity building of farmers and their organization

Irrigation Water Users Association (IWUA)

- Operation and maintenance of the secondary and tertiary irrigation & drainage infrastructure
- Collection and payment of the operation and maintenance fees
- Drawing & implementation of the cropping calendar
- Drawing & implementation of the irrigation schedule

Farmer

- Maintenance of the feeder canal and field drain on her/his farm
- Irrigation of her/his farmer as per the IWUA irrigation schedule
- Payment of operation and maintenance fees & water charges
- Abiding with the IWUA by-laws
- Crop production

GROUP ACTIVITY

By the end of the session the participants should be able to have answers to the following questions

- Are the actors in the irrigation water supply chain delivering on their mandates?
- What are the challenges experienced?
- What are the possible solutions?
- Way Forward

ANNEX: TIMETABLE

DAY 1

TIME	SESSION	FAILITATOR
8.00 – 8.15 Am	Registration	
8.15 –8.30 Am	Opening Program	
8.30 – 8.45 Am	Climate Setting	
8.45 – 9.00 Am	Pre-training Evaluation	
9.00 – 11.00 Am	Introduction to on-farm irrigation water management	SCIO
11.00 – 11.30 Am	BREAK	
11.30 – 1.30Pm	Soil-crop water relationships	SCIO
1.30 – 2.30 Pm	LUNCH BREAK	
2.30 – 4.30 Pm	Crop water requirement	SCIO

DAY 2

TIME	SESSION	FAILITATOR
8.00 – 8.30 Am	Recap	
8.30 – 10.30 Am	Introduction to various irrigation technologies	SCIO
10.30 – 11.00 Am	BREAK	
11.00 – 1.00 Pm	on-farm irrigation Water distribution	SCIO
1.00 – 2.00 Pm	LUNCH	
2.00 – 3.00 Pm	Irrigation water supply chain	SCIO
3.00 – 4.00 Pm	Practical's	
4.00 – 5.00 Pm	Post training Evaluation & Action Plans	

On farm visit for demonstrations

VENUE:

- Training Hall
- Farmers' Fields

ANNEX 2: ON FARM WATER MANAGEMENT MODULE

SPECIFIC OBJECTIVES	SESSION	SESSION OBJECTIVES At the end of this session the participants should be able to:
1.To understand the aspects of on-farm irrigation water management	Introduction to on-farm irrigation water management	<ul style="list-style-type: none"> • Define on-farm irrigation water management • Identify activities in on-farm irrigation water management • Explain the importance on-farm irrigation water management • Outline the challenges faced in on-farm irrigation water management
2.To understand the soil-crop water relationships	Soil-crop water relationships	<ul style="list-style-type: none"> • Describe soil and its properties in relation to crop choice and irrigation • Discuss soil-crop water relationships
3. To understand crop water requirements	Crop water requirement	<ul style="list-style-type: none"> • Define crop water requirements • Discuss factors determining crop water requirements • Describe determination of irrigation water requirements
4.To understand different irrigation technologies	Introduction to various irrigation technologies	<ul style="list-style-type: none"> • Discuss the different irrigation technologies • Describe the selection criteria for suitable irrigation technologies

<p>5.To understand on-farm irrigation water distribution</p>	<p>on-farm irrigation Water distribution</p>	<ul style="list-style-type: none"> • Define on-farm irrigation water distribution • Outline factors to consider in on-farm irrigation water distribution • Demonstrate ability to carry out equitable on-farm irrigation water distribution • Identify and list water control structures for different irrigation methods
<p>6.To understand irrigation water supply chain</p>	<p>Irrigation water supply chain</p>	<ul style="list-style-type: none"> • Describe the irrigation water supply chain • describe the water distributive roles of different actors along the irrigation water supply chain

MODULE V: IRRIGATION SYSTEM MANAGEMENT

Broad Objective:

To build capacity of the IWUA to effectively manage the Operation and maintenance of an Irrigation System for sustainable agricultural production.

To understand the role of IWUA in Irrigation System Management.

To understand the various aspects of Irrigation System Management.

To understand the Designed Irrigation System (Infrastructure)

To understand planning for Irrigation System Management

To understand Operation of the Irrigation Infrastructure

To understand Maintenance of the Irrigation Infrastructure

No.	Specific Objectives	Sessions	Session Objectives
			At the end of the sessions the participants will be able to:
1	To understand the various aspects of Irrigation System Management.	Introduction to Irrigation Systems Management.	<ol style="list-style-type: none">To define irrigation and drainage.To define an irrigation system.To describe the various components of an Irrigation System, functions and their interrelationship (Infrastructure, IWUA and Production- Components)Explain what Irrigation System Management entails and its importance.
2	To understand the Designed Irrigation	Designed Irrigation System	<ol style="list-style-type: none">To outline designed project area.

	System (Infrastructure)		<ul style="list-style-type: none"> b. To describe the infrastructural components of the Irrigation System (Abstraction, Conveyance, Distribution, Application and Drainage) c. To discuss the Environmental and Social Safeguards incorporated in the Design.
3	To understand planning for Irrigation System Management	Planning for irrigation system management.	<ul style="list-style-type: none"> a. Outline the processes involved in Irrigation System Management planning. b. Discuss Cropping Programme, Calendar and Pattern. c. Discuss Irrigation Scheduling and Water Distribution Plan. d. Demonstrate ability to undertake Irrigation Planning through preparation of Irrigation Scheduling, Cropping Programme, Water Distribution Planning and Maintenance Scheduling.
4	To understand Operation of the Irrigation Infrastructure	Operation of Irrigation Infrastructure	<ul style="list-style-type: none"> a. Define Operation of an Irrigation Infrastructure. b. Outline activities involved in Operation. c. Describe the functions of various components of the Irrigation Infrastructure,

			<p>handling and manipulation.</p> <p>d. Explain Water Distribution, Control techniques and mechanisms.</p> <p>e. Discuss the importance of collecting water flow data to inform management decisions.</p> <p>f. Discuss Costing of Operation activities.</p>
5	To understand Maintenance of the Irrigation Infrastructure	Maintenance of Irrigation Infrastructure	<p>a. Define Maintenance of Irrigation Infrastructure and its importance.</p> <p>b. Outline activities involved in Maintenance (Canal Clearing, De-silting, Repairs).</p> <p>c. Discuss the different types of maintenance (routine and emergency).</p> <p>d. Discuss Maintenance Scheduling.</p> <p>e. Discuss Costing of Maintenance works.</p>
6	To understand the role of IWUA in Irrigation System Management.	IWUA Organizational Structures for O&M	<p>a. Explain core duties and responsibilities of the IWUA in relation to the Irrigation System Management.</p> <p>b. Describe IWUA organizational structures and their functions in relation to O&M.</p> <p>c. Discuss the levels of O&M</p>

			<p>activities by the IWUA and other bodies/Institutions.</p> <p>d. Discuss challenges in irrigation systems management (water distribution inefficiency, water theft)</p> <p>e. Discuss O&M operational procedures and policies.</p> <p>f. Discuss incorporation of policies into IWUA bylaws.</p>
7	To understand Irrigation System Management in relation to Agricultural Production	Agricultural Production and Irrigation System Management.	<p>a. To discuss ways of managing activities in the Cropping calendar.</p> <p>b. Discuss strategies for synchronization of Cropping Programmes/Calendars with Irrigation System Management.</p> <p>c. To explain the role IWUA in agricultural extension.</p> <p>d. Discuss Environmental monitoring, M&E data: irrigation efficiencies, water quality, Catchment Protection, Environmental Audit, their importance in Water Conflict Management and in compliance with existing laws EMCA, Water Act .Worker - Health Safety and Welfare for sustainable agriculture.</p>

8	To understand the concept of Budgeting for O&M and importance of payment of Irrigation Service Fee.	Budgeting for O&M and Payment of Irrigation Service Fee	<ul style="list-style-type: none"> a. Discuss cost elements of O&M of an Irrigation System. b. Explain the importance of the Irrigation Service Fee. c. Demonstrate ability to calculate levy and collect Irrigation service fee. d. Discuss management of Irrigation Service fee collection and proper record keeping. e. Discuss Irrigation Service fee in relation to IWUA budget. f. Demonstrate the ability to prepare IWUA and O&M Budget. g. Discuss Monitoring and Evaluation in Irrigation Systems Management.

5.1 SESSION 1: INTRODUCTION TO IRRIGATION SYSTEMS MANAGEMENT.

GENERAL OBJECTIVES OF THE SESSION

At the end of the session, the participants should be able to understand the various aspects of Irrigation System Management.

SPECIFIC OBJECTIVES OF THE SESSION

At the end of this session the participants should be able to:-

1. Define irrigation and drainage.
2. Define an irrigation system.
3. Describe the various components of an Irrigation System, functions and their interrelationship (Infrastructure, IWUA and Production- Components)
4. Explain what Irrigation System Management entails and its importance.

MAIN CONTENT OF THE SESSION (SUBJECT MATTERS)

1. Irrigation and Drainage.
2. Irrigation Systems.
3. Components of an Irrigation System.
4. Importance of Irrigation System Management.

SESSION PLAN (SESSION FLOW)

1. Define Irrigation and Drainage.
2. Define an Irrigation System.
3. Describe the various components of an Irrigation System, their functions and interrelationships
 - Infrastructure:
 - IWUA
 - Production Units etc.
4. Explain what Irrigation System Management entails and its importance.

METHODOLOGY: Enhanced Lecture, Small Group Task, Plenary Presentation.

TIME ALLOCATION: 1 ½ Hours

Introduction to Irrigation Systems Management.

Definition of Irrigation and Drainage.

Irrigation is the artificial application of controlled amount of water is supplied to plants at regular intervals for agriculture. It is used to assist in the growing of agricultural crops, maintenance of landscapes, and revegetation of disturbed soils in dry areas and during periods of inadequate rainfall.

Drainage is defined as the natural or artificial removal of surface and sub-surface water from an area. The internal drainage of most agricultural soils is good enough to prevent severe waterlogging (anaerobic conditions that harm root growth), but many soils need artificial drainage to improve production or to manage water supplies.

Irrigation System: is the method in which water is supplied to plants at regular intervals for agriculture. It is used to assist in the growing of agricultural crops. This not only includes the entire infrastructure involved in abstraction, conveyance and application of water to crop at the field, but the human resource components such as the IWUA, Production Unit and any other organizations that facilitate production activities in the Irrigation Project.

Components of irrigation system infrastructure.

Irrigation System infrastructure comprises of the following components:

- Abstraction system.
- Conveyance system.
- Application system.
- Drainage system.

Abstraction: This is the point which water is obtained from a stream, a borehole, dam etc. The Abstraction can be through use of gravity as driving force for the transport of water or pumping using centrifugal pumps, submersible borehole pumps etc. Some of the common water abstraction infrastructure/structures typical to irrigations schemes include:

- Weirs.
- Pumps and pump stations.

- Dams.
- Diversion channels etc

Example of a weir

Irrigation Pump Station

Dam

Mobile Irrigation Pump

Conveyance system: This is the infrastructure used to transport water from the abstraction point to the fields. This could be in the form of:

- Open Canals: Earth or Concrete lined.
- Closed Conduits: Pipes, Culverts

Conveyance through closed conduits/Pipes.

Irrigation Canals: Concrete Lined.

Application systems: refers to the method the water is applied to the crop at field level. This could be through the following technologies:

- Furrow
- Basin
- Sprinkler.
- Drip and micro sprinklers
- Centre Pivot.

Furrow Irrigation Technique

Sprinkler Irrigation Techniques.

B

asin Irrigation

Furrow Irrigation

Basin Irrigation

Sprinkler Irrigation.

Drip Irrigation System

Centre Pivot Irrigation System.

Irrigation System Management refers to the operation and management of an irrigation system.

Its Sub-systems are:

1. Physical systems: structures and facilities for the movement of irrigation water.
2. Social system: the people providing the irrigation services and the beneficiaries. (IWUA
3. Resources system: the irrigation water and agricultural crops
4. Operational procedures and policies: rules and regulations.(By laws, Irrigation Act,Water Act, EMCA Act)

The results obtained from Irrigation Management are dependent on interactions of these subsystems.

The following are those that are managed in an Irrigation system:

- Cropping Calendar and Cropping Pattern: If properly managed, organized planting is simplified facilitation equitable distribution of water.
- Delivery and distribution of Irrigation Water: it is from the cropping program that a Water Distribution Schedule is prepared to enable proper water management and reduce conflicts brought about by inadequacy, inequity and non-reliability of irrigation water.
- Maintenance and Repair of Irrigation facilities and structures: Proper management results in better delivery and distribution of irrigation water, prolonged period between major rehabilitation and reduced costs of major repairs.
- Collection and remittance of irrigation services fees(ISF) and amortization: When properly managed , more funds for repair and capital build up for the IWUA

Importance of Irrigation Systems Management:

Plenary discussion: discuss with the farmers their views on the importance of Irrigation Systems

5.2 SESSION 2: DESIGNED IRRIGATION SYSTEM (INFRASTRUCTURE)

GENERAL OBJECTIVES OF THE SESSION

At the end of the session, the participants should understand the designed Irrigation System /Infrastructure.

SPECIFIC OBJECTIVES OF THE SESSION

At the end of this session the participants should be able to:-

- i. Outline designed project area
- ii. Describe the infrastructural components of the Irrigation System (Abstraction, Conveyance, Distribution, Application and Drainage)
- iii. Understand the Environmental and Social Safeguards incorporated in the Design.

MAIN CONTENT OF THE SESSION (SUBJECT MATTERS)

1. Project Area and development area
2. Irrigation and drainage system
3. Environmental and Social Safeguard

Session Plan (Session Flow)

- i. Description of the project area and development area
- ii. Description of the Irrigation and Drainage System
- iii. Discussion of the Environmental and Social Safeguards incorporated in the design
 - Environmental and Social Impacts
 - Proposed mitigation measure

METHODOLOGY: Enhanced Lecture, Small Group Task, Plenary Presentation

TIME ALLOCATION: 4 Hours.

RESOURCE MATERIALS

PROJECT AREA AND DEVELOPMENT AREA

The project area is located in the Busia and Siaya Counties in the western part of the country as shown in the figure below.

Project Area

The Lower Nzoia Irrigation Project (LNIP) is designed as a gravity system with its intake about 37 km upstream of L. Victoria. The intake is designed as a weir structure abstracting water for both the proposed LNIP Phase I (on the southern side of the river) and LNIP Phase II (on the northern side of the river).

Water supply to Phase II separates at 2.9 km from the intake and crosses to the northern bank via an aqueduct. Water in LNIP Phase I is conveyed mainly through open earth canals with only the main canal being lined.

The LNIP area comprises of 14 blocks covering an estimated gross area of 5,554 Ha and a net irrigation area of 4,077 Ha as shown in Table 2.1. The area supports a total number of 2,100 households, who are the target beneficiaries within the project area. The Bunyala irrigation scheme, which is a pumping system covering about 200 Ha and additional extended areas of about 500 Ha, shall be integrated into the LNIP. The pumping system must be replaced by a gravity system.

Table 2.1 - Irrigation Area

Block	Gross area (ha)	Net area (ha)
1	68	48
2	245	197
3	360	240
4	567	339
5	369	166
6	269	223
7	382	325
8	798	646
9	312	201
10	544	455
11	187	121
12	464	410
13	243	166
14	746	540
Total	5,554	** Expression is faulty **

The layout of the project is shown in Figure 2.2

Irrigation and Drainage System

The summary of Irrigation and drainage infrastructure is as shown in Table 2.2:

Table 2.2: Irrigation and Drainage Infrastructure components

Component	Unit of measurement
Net Area irrigated – net (ha)	4,077 ha
Gross Area covered by project (ha)	5,708 ha
Design discharge	10 m ³ /s
Main Canals	31.5 km
Secondary Canals	29.6 km
Tertiary Canals	44 km
Main and Secondary Drains	30.8 km
Tertiary Drains and field drains	473.1 km
Roads along the main canal (Type I)	24.5 km
Roads along the secondary and tertiary canals (Type II)	46 km
Road bridges	3
Footbridges	285
Box and pipe culverts	661
Infrastructure and facilities for PIU and Apex IWUA	2-No. offices 10-No. houses

PIU storage and laboratory compound	1-No. laboratory building 1-No. warehouse and cold room, 1-No guardhouse, 1-No. fuel store
Headworks operator house and office/diversion weir guardhouse	1-No. house 1-No. guardhouse
IWUA Meeting room buildings	7-No. buildings

Environmental and Social Safeguards

Environmental and Social Impacts

During implementation of the project, the potential adverse impacts are likely to be:

1. Soil Erosion
2. Air Pollution
3. Noise Pollution
4. Vegetation loss (flora and fauna)
5. Waste generation and pollution
6. Traffic disruption
7. Disruption and strain on social amenities
8. Loss of livelihoods (fisheries, and harvesting, grazing areas)
9. Loss of assets other than land (structures, graves, trees and crops)
10. Water Pollution (agrochemicals)
11. Water Wastage
12. Aquatic Impacts
13. Land Acquisition/Displacement (economic and physical)
14. Public Health Diseases (water borne, sexually transmitted)
15. Population Influx
16. Workers Health and Safety
17. Restriction of access water (livestock) and movement as a result of canals

Proposed Mitigation Measures

The proposed mitigation measures will be as follows:

1. Compensation for loss of land and assets
2. Avoid acquisition of land through design approaches
3. Development of Waste Management Plan
4. Development and implementing Traffic Management Plan
5. Development and implementing Air Emission Control Plan
6. Provision of Personal Protective Equipment (PPE) to workers
7. Education, awareness and sensitization on sexually transmitted diseases (HIV/AIDS)
8. Maintaining environmental flows
9. Selective removal of vegetation and re-planting
10. Developing and implementing Integrated Pest Management Plan

3.1

5.3 SESSION 3: PLANNING FOR IRRIGATION SYSTEMS MANAGEMENT.

GENERAL OBJECTIVES OF THE SESSION

At the end of the session, the participants should be able understand planning for Irrigation System Management

SPECIFIC OBJECTIVES OF THE SESSION

At the end of this session the participants should be able to:-

1. Outline the processes involved in Irrigation System Management planning.
2. Discuss Cropping Programme, Calendar and Pattern.
3. Discuss Irrigation Scheduling and Water Distribution Plan.
4. Demonstrate ability to undertake Irrigation Planning through preparation of Irrigation Scheduling, Cropping Programme, Water Distribution Planning and Maintenance Scheduling.

MAIN CONTENT OF THE SESSION (SUBJECT MATTERS)

1. Irrigation Systems Management Planning Processes.
2. Cropping Calendar, Cropping Program and Pattern.
3. Irrigation Scheduling and Water Distribution Plan.
4. Group work to demonstrate ability in Irrigation Systems Management Planning.

SESSION PLAN (SESSION FLOW)

1. Processes involved in Irrigation Systems Management planning.
2. Cropping Programme, Calendar and Pattern.
3. Irrigation Scheduling and Water Distribution Plan.
4. Conduct exercises to demonstrate ability to undertake Irrigation Planning through preparation of Irrigation Scheduling, Cropping Programme, Water Distribution Planning and Maintenance Scheduling.

METHODOLOGY: Enhanced Lecture, Small Group Task, Plenary Presentation.

TIME ALLOCATION: 5 ½ Hours

RESOURCE MATERIALS

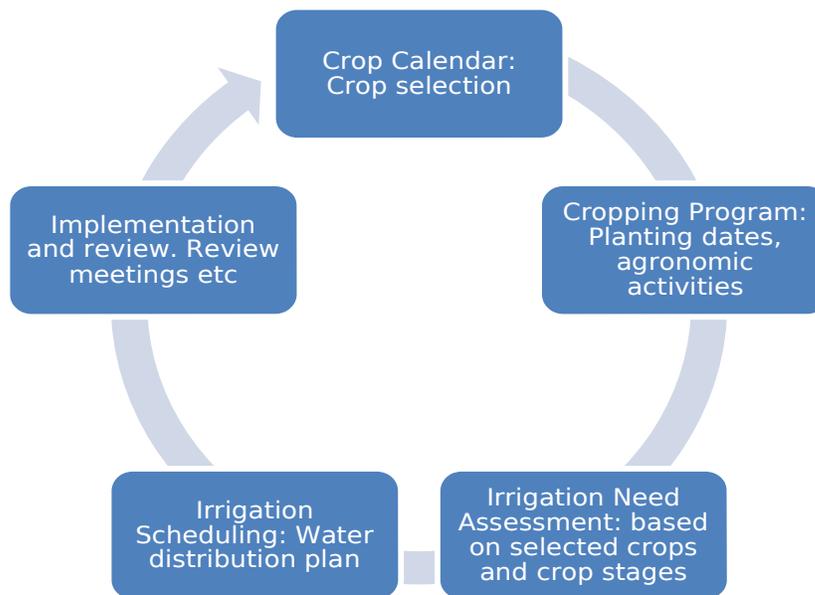
Processes Involved in Irrigation Systems Management.

After conducting Market surveys and margin analysis farmers, select the crops they are going to grow at a particular time in the year. This gives rise to a proposed Cropping Calendar.

Information and data contained in the Cropping Calendar:

- Type of crop and variety:
- Proposed planting / sowing date.
- Acreage for each crop/ irrigation unit.

IRRIGATION SYSTEMS MANAGEMENT CYCLE



The Cropping Calendar gives rise to the Cropping Program which contains mainly:

Planting dates, acquisition of farm inputs, land preparation, general agronomic practises but on a time frame, Harvesting dates.

Once the Cropping Program has been developed an Irrigation need assessment is conducted and the Cropping program adjusted accordingly to ensure water availability and adequacy.

Irrigation Need Assessment.

This involved determining the gross irrigation water requirement for the entire Irrigation Scheme inclusive of all Irrigation units. It takes into consideration both climatic data and the various crop stages in each Irrigation unit.

Crop Water Requirement.

The major climatic factors (see Fig. 4) which influence the crop water needs are:

- sunshine
- temperature
- humidity
- windspeed

The ***crop water need (ET crop)*** is defined as the depth (or amount) of water needed to meet the water loss through evapotranspiration. The crop water need always refers to a crop grown under optimal conditions, i.e. a uniform crop, actively growing, completely shading the ground, free of diseases, and favourable soil conditions (including fertility and water). The crop thus reaches its full production potential under the given environment.

The crop water need mainly depends on:

- the climate: in a sunny and hot climate crops need more water per day than in a cloudy and cool climate
- the crop type: crops like maize or sugarcane need more water than crops like millet or sorghum
- the growth stage of the crop; fully grown crops need more water than crops that have just been planted.

The highest crop water needs are thus found in areas which are hot, dry, windy and sunny. The lowest values are found when it is cool, humid and cloudy with little or no wind.

The influence of the climate on crop water needs is given by the reference crop evapotranspiration (ET_o). The ET_o is usually expressed in millimetres per unit of time, e.g. mm/day, mm/month, or mm/season. Grass has been taken as the reference crop.

Formula: $ET_o = K_{pan} \times E_{pan}$

with:

ET_o: reference crop evapotranspiration

K_{pan}: pan coefficient

E_{pan}: pan evaporation

INFLUENCE OF CROP TYPE ON CROP WATER NEEDS (K_c)

The relationship between the reference grass crop and the crop actually grown is given by the crop factor, K_c, as shown in the following formula:

$ET_o \times K_c = ET_{crop}$

with ET_{crop} = crop evapotranspiration or crop water need (mm/day)

K_c = crop factor

ET_o = reference evapotranspiration (mm/day)

Both ET_{crop} and ET_o are expressed in the same unit: usually in mm/day (as an average for a period of one month) or in mm/month.

The crop factor, K_c, mainly depends on:

- the type of crop
- the growth stage of the crop
- the climate

CALCULATION OF THE CROP WATER NEED

The crop water need ET crop is calculated on a monthly basis, using the formula:

$$ET \text{ crop} = ETo \times Kc.$$

Where :

ET crop = is the evapotranspiration of a specific crop(Crop water Need)

ETo = is the reference evapotranspiration calculated using the Pan Method or

Once the Crop water need has been determined the irrigation water need is calculated.

Irrigation Water Need.

The irrigation water need is calculated using the following formula;

$$IN = ET \text{ crop} + PERC + WL - Pe$$

Where ET crop – is the crop evapotranspiration

Perc - Percolation

WL - Water Loss to filtration

Pe - effective rainfall

Net Irrigation Need

Net irrigation need = area * IN* 1/application efficiency * 1/conveyance efficiency * 1/ pump efficiency.

$$Net \text{ Irrigation Need} = \frac{Area * \dot{I}}{IE}$$

Where Area: refers to the area under crop.

IN = Cumulative Irrigation need

IE = Irrigation Efficiency = E application * E conveyance

Irrigation Scheduling is the process used by irrigation system managers to determine the correct frequency and duration of watering. The following factors may be taken into consideration: climatic factors (rainfall, wind-speed, temperature, irrigation technology in use etc.). This determines the Irrigation frequencies (nos.) and durations.

SAMPLE IRRIGATION SCHEDULE.

Crop Type and Variety: Rice (ITA.) Month: September.

Block	Acreage	Crop Stage	Week 1	Week 2	Week 3	Week 4	Week 5
A	150	1 st Weeding					
B	200	2 nd weeding					
C	80	Flowering					
D	120	Harvesting					

Example /Group Work

Trainer demonstrates the process of formulation of Cropping Calendar, Cropping Program, Irrigation Scheduling and water distribution planning.

5.4 SESSION 4: OPERATION OF IRRIGATION INFRASTRUCTURE.

GENERAL OBJECTIVES OF THE SESSION

At the end of the session, the participants should be to understand Operation of the Irrigation Infrastructure

SPECIFIC OBJECTIVES OF THE SESSION

At the end of this session the participants should be able to:-

1. Define Operation of an Irrigation Infrastructure.
2. Outline activities involved in Operation.
3. Describe the functions of various components of the Irrigation Infrastructure, handling and manipulation.
4. Explain Water Distribution, Control techniques and mechanisms.
5. Discuss the importance of collecting water flow data to inform management decisions.
6. Discuss Costing of Operation activities

MAIN CONTENT OF THE SESSION (SUBJECT MATTERS)

- 1 Operation of Irrigation Infrastructure.
- 2 Operation activities.
- 3 Operation of various irrigation Infrastructure.
- 4 Water Distribution and Control Techniques.
- 5 Water Flow Data.
- 6 Costing of Operations.

SESSION PLAN (SESSION FLOW)

1. Introduction to Irrigation Infrastructure.
2. Operation activities in Irrigation.
3. Components of Irrigation Infrastructure.
4. Water Distribution Control Techniques and mechanisms.
5. Water Flow Data and Irrigation Information Systems.
6. Costing of Operation Activities.

METHODOLOGY: Enhanced Lecture, Small Group Task, Field Visits, Plenary Presentation.

TIME ALLOCATION: 3 Hours

Operation of Irrigation Infrastructure.

Refers to the activities and processes involve in the abstraction and distribution of irrigation water for agricultural production with the aim of effective and efficient water use under management/participation by the IWUA.

These activities include:

- Preparation of cropping pattern plan.
- Irrigation water rotation plan.
- Irrigation water distribution and supply plan. Calibration of gate/discharge measurement devices, Proper gate operation
- Data collection, monitoring and evaluation on the irrigation water distribution and supply actually implemented at site.
- Data collecting of river discharge, rainfall, cropping area etc;
- Calibration of discharge measurement devices;
- Preparation of yearly irrigation water allocation plan, yearly irrigation water distribution and supply plan, yearly cropping pattern plan, and yearly dewatering plan, etc.;
- Implementation of weekly irrigation water distribution and supply to tertiary system including preparation of irrigation water allocation proposed by farmers, filling-up the irrigation operation board and gate opening arrangement;
- Gate operation of Diversion Weir and Intake Structure during flood occurrence;
- Operation of sedimentation basin such as flushing operation of Scour gate/ scour pipe;
- Coordination in the Water Resource Users Association (WRUA);
- Monitoring and evaluation of irrigation system operation and Maintenance activities, in accordance with Action Plan

Operation of Irrigation System

Activities and the scope in system operation.

(1) Planning

- a) Propose detailed cropping pattern plan;
- b) IWUA meeting on the proposed cropping pattern plan for consensus;
- c) Yearly water allocation plan; and
- d) Yearly irrigation water distribution and supply plan.

(2) Implementation

The work activities of irrigation system operation are as follow:

- a) Cropping area of each block/ Group;
- b) Confirmation on irrigation water distribution plan and actually implemented at site;
- c) Confirmation on irrigation water discharge requirement plan at intake structure
- d) Recording of irrigation water flow discharge in each canal/ pipeline;
- e) Confirmation on irrigation water distribution of main and sub-main irrigation canal/ pipeline;
- f) River flow/intake diversion weir discharge record;
- g) K-factor or Field Water Requirements (FPR) estimation;
- h) Report on crop productivity and irrigation water balance of each irrigation service area;

(3) Monitoring & Evaluation

The monitoring and evaluation activities toward the implementation of operation and maintenance of irrigation system is necessarily required to identify problems and difficulties and to find out a good solution and improvement for better irrigation operation and maintenance performance in the near future.

Such monitoring and evaluation activities shall be carried out in accordance with the Check List Form on the Manual of Operation and Maintenance of Irrigation System.

Standard Water Distribution

Proper operation of irrigation schemes requires attention to the following points:

- The water distribution should be in line with the design and crop water requirements
- There should be equitable water distribution among farmers
- Advice on proper water management in order to minimize water losses should be given.

Three irrigation water distribution methods are introduced in this item.

1. Rotation Flow

Irrigation date and flow quantity for each secondary canal/ pipeline is determined by SCIO/SE and water guard to achieve fair and adequate water distribution. Therefore defined water quantity is flowed in secondary canals/ pipelines continually. The members of each farm block must keep the irrigation date. And water guard and/or block leader must operate the gate/ valve/ inlet every day based on the defined rotation date.

2. Demand Oriented (Scattered)

This is the water distribution method which is calculated and designed based on farmer's water requirement.

In this case, facility scale becomes large. Therefore construction and management cost tend to be increased.

3. Continuous

Continuous method supplies irrigation water for all irrigation canal/ pipe line constantly. Therefore farmers can access irrigation water at any time. In this case also, facility scale becomes large. Therefore construction

Preparation for Irrigation System Operation

Proper irrigation scheduling and water distribution planning based on the agreed cropping calendar and the appropriate data of expected water demand and supply are the basis of the proper water management.

For adequate planning, following issues need to be discussed, confirmed and determined based on IWUA committee with SCIO/SE and SCAO.

- Cropping Calendar/ Pattern
- Irrigation Water Requirement
- Water Scheduling

Irrigation Block Management

Proper operation of irrigation schemes requires attention to the following:

- The water distribution should be in line with the design and crop water requirements
- There should be equitable water distribution among farmers
- Advice on proper water management in order to minimize water losses should be given

Water Distribution in each Block

Water in each block should be distributed fairly based on discussion and agreement of member's iwua belongs to the block.

Block leaders should have a responsibility to get farmers consensus.

Due to the fluctuation of the river discharge at diversion weir, monthly and annually, water abstraction is needed to be adjusted and hence the water distribution is also to be adjusted.

In case the irrigation water availability at the diversion weir is between 50% up to 70% of the original irrigation water allocation plan, the adjustment shall be applied as follows:

Water Storage

Construction of water storage is required due to WRMA regulation. Various levels of storages are considerable as shown in following.

- 1.- Scheme Level
- 2.- Block Level
- 3.- Farmer Level

Actual System Operation Method/system component purpose

1.Intake Facility

The diversion weir consists of weir, intake structure, scouring gate, sedimentation basin and side spillway. The diversion weir operation is required to :

- i) Raise water level,
- ii) Divert for conveyance & distribution and
- iii) supply irrigation water to the irrigation system

This requires well coordinated operation of intake gate and scouring gate of the irrigation system under the following condition.

Intake Weir and Related Structure

The main intake structure directs water from the source of supply such as a reservoir or a river, into the irrigation system.

Operation of intake structures should be conducted by water guard as representative of O&M subcommittee. And this operation is primacy and affecting for whole irrigation system. Therefore access to intake operating system has to be restricted to the water guard.

For example, handle of intake gate should be locked by chain and padlock which are managed by water guard.

General

The intake structure is provided with gates in order to properly manage flow discharge in main canal, and avoid sediment and flood water flow into canals. The general operation procedures of intake gate are as follow:

- a) The water level at weir site shall be recorded twice a day (minimum once a day in the morning) in normal condition and hourly recording (minimum 3 times during day time (morning, noon, evening)) is necessary during flood.
- b) Flow discharge in main canal shall be recorded any time whenever it changes (minimum once a day).
- c) Well coordination of intake gate and scouring/ flushing gate operation is necessarily required to get intake flow discharge as well as scheduled without serious sedimentation entering into main canal/ pipeline system.

The intake gate shall be fully closed if river is flooding or the sediment concentration of the source river flow is high.

- e) The water level in the upstream of weir shall not be higher than crest elevation of flood dike, and in order to maintain this condition the scouring/ flushing gate shall be fully opened during large flood.
- f) The sediment deposited in the upstream of weir shall be periodically flushed away through opening of scouring sluice gates.
- g) Cleaning up operation of trash rack from garbage shall be carried out regularly to maintain that the required irrigation water flow discharge can be attained.
- h) Cleaning up operation of trash rack shall be carried out after intake gate is closed.
- i) Except during repairing works, intake gate shall be opened.

Operation and Monitoring at Flood Condition

Emergency conditions such as head rain, floods and bank failures may occur from time to time during the long run operation of the Project. Following shall be considered as special treatment under such situations.

In case of floods occurring or are about to occur under the such conditions as the water level of upstream of the head works, water guard shall fully close the intake gate so as not to introduce water into the main canal to protect them. The water distribution, on the contrary, shall inspect the off-takes and canal conditions at that time to inspect the main canal condition the necessary action such as removing the garbage entering canals since the garbage tend to flow into the canal from outside the area to clog the turnout during heavy rain.

Operation and Monitoring at Water Shortage/ Drought Condition

As mentioned in clause 2.5, water distribution should be restricted in the case of water shortage/ drought condition. Every farmer has to keep the water restriction rule which is agreed in IWUA meeting.

Water abstraction and water distribution in main canal should be operated by water guard on behalf of O&M sub committee with responsibly. On the other hand, water distribution in secondary canal and under should be operated and monitored by block leaders.

Farmers should divide and distribute restricted water equitably among the block members under guidance of each block leader.

Operation and Monitoring at Other Disaster Condition

Infrastructure Collapse

-In the case of the collapse of infrastructure, water guard/ block leader/ farmer, who find it, must report it to SCIO/SE, IWUA chairman, representative of O&M subcommittee, water guard, block leader and farmers who has farm/ habitat near the affected area.

-SCIO/SE, IWUA and O&M subcommittee immediately must decide the solution method and take necessary action with discussion and site inspection.

Conveyance, Main Canal

-The conveyance system assures the transport of water from the main intake structure or to the field ditches.

-The main canals and turnout shall be operated by the water guard as representative of O&M sub-committee and be strictly prohibited to be operated by other persons. The tasks to be done by the water guard are itemized below.

Water guard tasks

- ✓ operate gates at intake
- ✓ operate gates at section division boxes
- ✓ .monitor system operation efficiency
- ✓ .report defects accordingly
- ✓ keep proper records of works
- ✓ REPAIR ANY DEFFECTS NOTICED

Secondary/ Feeder Canal/ Field Level

Secondary canals are operated by each Block Leader.

The field application system assures the transport of water within the fields.

The role of irrigation block leader is described below.

- ✓ Ensure equitable water distribution
- ✓ Adhere to irr. schedule
- ✓ Monitor efficiency of block operation & maintenance
- ✓ Keep block records

The followings are **Routine Operation and Monitoring**

check/ operation/ monitoring items for routine operation/ monitoring

R-1) Record water level in river at staff gauge measuring point

R-2) Make adequate adjustment of intake gate openings/ scouring gate based on the river discharge condition and weir operation table explained on pages 59-61.

R-3) Record water level in canal at staff gauge measuring point

R-4) Make required changes in gate openings along main canal/ distribution canals, based on the discharge table

R-5) Record discharge released into all sub-main/ distribution canals/ direct outlets off-taking from the canal within his jurisdiction

R-6) Record releases from escapes

R-7) Check security and safety devices

R-8) Record pertinent information in Operating Log

R-9) Check escape tail channel for debris

Periodical Operation and Monitoring

The followings are check/ operation/ monitoring items for periodical operation/ monitoring

a) Monthly

P-1) Check intake gate(s) conditions

P-2) Check condition of:

- Top of canal embankment
- Upstream and downstream faces
- Abutment contacts
- Rodent problems
- Measuring devices (staff gauges etc)

P-3) Inspect and repair animal burrows, eliminate animals

P-4) Inspect, remove and repair encroachments

b) Quarterly

P-4) Operating instructions—ensure up to date & legible

P-5) Check & clear operating decks

P-6) Inspect and repair settlement, sloughs, slumps, bulges, cracks and depression.

c) Semiannually

P-7) Lubricate gate frames and rollers

- P-8) Lubricate hoist spindles
- P-9) Replace grease in gear case of hoist
- P-10) Check rubber seals and seal clamps
- P-11) Check paint on gates
- P-12) Inspect embankments and channels for trees, vegetation, shrubs, brush, growth and remove deep rooted vegetation and shrubs
- P-13) Inspect embankment for erosion. Also look for erosion around and under structures.
- P-14) Inspect and record quality and clarity of seepage and corresponding water level in the canal
- P-15) Inspect end of each outlet for breaks, undercutting

d) Annually

- P-16) Check and repaint metal works of operating decks, gates etc
- P-17) Review Standing Operating Procedure
- P-18) Exercise gates and valves
- P-19) Examine apron, spillways, falls & outlets and carry out repairs and report evidence of structural instability, erosion, cavitation etc.
- P-20) Inspect canal lining and repair and replace the same in deficient areas
- P-21) Inspect concrete and masonry surfaces for deterioration including scaling, pitting, spalling, pop outs, crumbling, cracking
- P-22) Inspect ends of drainage canals and clean out debris/ material that might choke the drain.

Disaster/ Emergency Operation and Monitoring

After Heavy rains

E-1) Inspect and repair embankments

E-2) Inspect and repair escapes and drainage structures

E-3) De-silt upstream of diversion weir and other structures

Infield water application

The field application system assures the transport of water within the fields.

Water application methods vary according to the following circumstances;

- 1) Available pressure,
- 2) Farmer's resources,
- 3) Available technology,
- 4) Level of farmer's knowledge.

1) Surface irrigation method

- Furrow

- Basin

- Flood

The farmers should be trained on preparation and sizing of the structures to allow water to furrow uniformly

Water drainage

Water drainage is necessary to remove excess water from the field especially in the case of flood and heavy rain. Therefore drainage line should be located at adequate place considering the land condition and circumstance.

Water Storage Structures

Water storage is necessary according to WRMA requirements. Water storage structures should be placed strategically to favor the flow of water back to the scheme. Method of water supply as well as usage of water from the storage facilities are assumed/ proposed as follows:

Method of Water Supply to Water Storage

Method of Water Utilization

Data Collection and Record keeping

- Recording intake discharge by staff gauge readings and calibration (canal system) or bulk water meter (pipe system) is important for informing WRMA on the actual scheme water usage and hence the periodic charges. The SCIO/SE should collaborate with WRMA hydrologist for necessary calibrations, recordings and analysis of collected data according to installed equipment.
- Daily and Monthly data collection and record keeping are important for feedback to the crop and water distribution planning of the next year/ season.
- And it is also important because it will be essential information when SCIO/SE and water guard check the water distribution, adjust water distribution and address problem/ disaster of irrigation facilities/ water distribution.

Category	Responsibility to solve the Conflict/ Trouble	Example of Conflict/ Trouble
Problem happened in block	Block Leader	<ul style="list-style-type: none"> - Illicit water abstraction - Unfair water distribution - Disregard/ objection to block leader
Problem between a block and another block	O&M sub committee	<ul style="list-style-type: none"> - Illicit water abstraction - Unfair water distribution
Problem affecting all IWUA members	IWUA committee	<ul style="list-style-type: none"> - Flood - Collapse of irrigation facilities
Problem depending external factor	IWUA committee	<ul style="list-style-type: none"> - Illicit water abstraction by nonmember

Operation Cost

The financial responsibility for O&M lies with the IWUA and only in cases that are beyond their means can they seek assistance.

For adequate and sufficient operation, following cost might be considerable. But its necessity and method of expenditure should be carefully discussed in IWUA meeting based on IWUA's bylaw.

- Cost for IWUA general meeting and O&M subcommittee meeting
- Cost of maintaining a water guard
- Cost for communication and transportation
- Allowances according to the provisions in the by-laws

OPERATION DURING EXTREME CLIMATIC CONDITONS

1. DURING FLOODS

-In case of floods or are about to occur under the such conditions as the water level of upstream of the head-works is expected to rise, water guard shall fully close the intake gate so as not to introduce water into the main canal to protect them

DURING DROUGHT

DURING THIS TIME, water distribution should be restricted in the case of water shortage / drought condition. Every farmer has to keep the water restriction rule which is agreed in IWUA meeting

5.5 SESSION 5: MAINTENANCE OF IRRIGATION INFRASTRUCTURE.

GENERAL OBJECTIVES OF THE SESSION

At the end of the session, the participants should be to understand maintenance of the Irrigation Infrastructure

SPECIFIC OBJECTIVES OF THE SESSION

At the end of this session the participants should be able to:-

- 1 Define Maintenance of Irrigation Infrastructure and its importance.
- 2 Outline activities involved in Maintenance (Canal Clearing, De-silting, Repairs).
- 3 Discuss the different types of maintenance (routine and emergency).
- 4 Discuss Maintenance Scheduling.
- 5 Discuss Costing of Maintenance works

MAIN CONTENT OF THE SESSION (SUBJECT MATTERS)

1. Maintenance of Irrigation Infrastructure
2. Activities in Maintenance of Irrigation Infrastructure
3. Types of Maintenance
4. Maintenance scheduling and Budgeting.

SESSION PLAN (SESSION FLOW)

1. Introduction to maintenance Irrigation Infrastructure.
2. Maintenance activities in Irrigation.
3. Types of Maintenance in Irrigation.
4. Maintenance Schedule.
5. Costing of Maintenance Operation Activities.

METHODOLOGY: Enhanced Lecture, Small Group Task, Field Demonstrations/Visits, Plenary Presentation.

TIME ALLOCATION: 2 ½ Hours

RESOURCE MATERIALS.

MAINTENANCE OF IRRIGATION INFRASTRUCTURE.

Define Maintenance of Irrigation Infrastructure.

For efficient use of the project facilities, it is essential to keep the facilities in a good working condition. Maintenance is broadly divided into two categories: regular maintenance such as routine minor maintenance works and periodical maintenance works.

Importance of Maintenance of Irrigation Infrastructure.

- ✓ Prevention of damage to infrastructure e.g cleaning of debris around Pump house intakes screens, Removal of water hyacinth at intakes and along canals to ensure free flow of water to the fields.
- ✓ Protection: some maintenance is undertaken to protect existing infrastructure from damage e.g. removal of silt along the spill way of a dam to prevent flooding
- ✓ Repair e.g repair of a damaged pipe supplying water to the fields.
- ✓ Replacement of worn out parts e.g replacement of the impeller of a pump after some year to increase pump efficiency.

Generally maintenance is inevitable and is required to ensure the Irrigation Infrastructure is functional throughout the lifespan of the Project.

TYPES OF MAINTENANCE.

The ***Routine Minor Maintenance*** works mean simple routine works such as taking out of floating material in front of gates, greasing of gate spindles, minor painting, and grass cutting around gates etc. These works are normally done by the respective gate operators in the course of their daily operation works.

The ***Periodic maintenance works*** mean large scale works such as desilting from canals and drains, roads maintenance, grass/bush cutting along canal and drains repair of structures and so on. These works will be done during the water cut period when crops have just been harvested. Unexpected large scale maintenance works may be executed by a contractor on contract basis.

The ***Emergency repairs*** works will be carried out as emergency countermeasures when emergency matters happen such as canal break or dyke breach by flood. In order to find an emergency case as soon as possible or to predict it, it is necessary to carry out frequent inspections to ascertain the conditions of the project facilities.

Costs for Maintenance Work.

IWUA general meeting and O&M subcommittee meeting

- Maintaining a water guard
- Communication and transportation
- Allowances according to the provisions in the bylaws
- Necessary tools, materials and spare/replacement parts
- Hiring skilled labor
 - Funding and expenditure for emergency repair
 - Funding for future rehabilitation

Types of Maintenance Costs.

Labour Costs: Payment of Water guard, cost of contracted labour

Service Costs: Payment for routine service of machinery.

Wear and Tear Costs:

Repair Costs: Purchase of spares

5.5 SESSION 6: IWUA ORGANIZATION STRUCTURES FOR O&M.

GENERAL OBJECTIVES OF THE SESSION

At the end of the session, the participants should understand the role of IWUA in Irrigation System Management.

SPECIFIC OBJECTIVES OF THE SESSION

At the end of this session the participants should be able to:-

- a. Explain core duties and responsibilities of the IWUA in relation to the Irrigation System Management.
- b. Describe IWUA organizational structures and their functions in relation to O&M.
- c. Discuss the levels of O&M activities by the IWUA and other bodies/Institutions.
- d. Discuss challenges in irrigation systems management (water distribution inefficiency, water theft)
- e. Discuss O&M operational procedures and policies.
- f. Discuss incorporation of policies into IWUA bylaws.

MAIN CONTENT OF THE SESSION (SUBJECT MATTERS).

1. IWUA duties and responsibilities.
2. IWUA Organizational Structure.
3. IWUA and Other Bodies Responsibilities/Level of O&M.
4. Irrigation Systems Management Systems Challenges.
5. O&M Procedures and Policies.

SESSION PLAN (SESSION FLOW)

6. Introduction to maintenance Irrigation Infrastructure.
7. Maintenance activities in Irrigation.
8. Types of Maintenance in Irrigation.
9. Maintenance Schedule.
10. Costing of Maintenance Operation Activities.

METHODOLOGY: Enhanced Lecture, Small Group Task, Field Demonstrations/Visits, Plenary Presentation.

TIME ALLOCATION: 1 ½ Hours

RESOURCE MATERIALS

Definition of Irrigation Water Users Association (IWUA).

A group of farmers within a geographical location, who have come together for the common interest of utilizing a common water resource for the purpose of Irrigation and drainage. The group members make joint efforts to install, operate, maintain and manage the irrigation facility for the benefit of all members.

Core Duties and responsibilities of the IWUA.

IWUA roles and functions are categorised in stages of IWUA development.

- Initiation stage
- Planning stage
- Implementation stage
- Operation and Maintenance stage

Roles and Functions of the IWUA in Operation and Maintenance Stage.

Operation and maintenance is the sole responsibility of the IWUA in irrigation scheme. The following are some of functions of IWUA related to O&M

- 1) Data Collection and Record keeping
- 2) O&M Planning
- 3) O&M implementation
- 4) Stakeholder engagement
- 5) O&M monitoring and evaluation

Data collection and record keeping.

- Record of cropping area and varieties of crop yields and of cropping
- Record of the condition and functions of irrigation facilities and structures that need routine and periodic maintenance.

O&M Planning

- Undertaking soil and water testing
- Undertaking market survey
- Proposal of cropping pattern plan
- Proposal of irrigation water allocation, distribution and supply plan
- Agreement of seasonal cropping pattern
- Agreement on periodic irrigation system operation plan

- Agreement on irrigation water distribution and supply plan

O&M Implementation

- Proposal of irrigation water requirement based on area of cropping and varieties of crops in each cropping stage
- Agreement on implementation of irrigation water distribution and supply as originally scheduled and planned
- Participation in gates operation and routine maintenance voluntarily e.g. opening, closing and greasing
- Participation in the joint site inspection to check the condition and function of irrigation facilities and also to confirm that the irrigation water supply is as originally planned or not
- Participation in the maintenance of main and secondary irrigation system under communal work

Stakeholder Engagement.

A “stakeholder” can be defined as: Any individual, group, or institution that has a vested interest in the natural resources of the project area and/or who potentially will be affected by project activities and have something to gain or lose if conditions change or stay the same.

Stakeholders are all those who need to be considered in achieving project goals and whose participation and support are crucial to its success.

Irrigation involves multiple stakeholders with varying interests. It is therefore important for an IWUA to identify carry out and set the levels of engagements with those identified as critical towards the success of the irrigation scheme.

O&M Monitoring and Evaluation.

- a) Active participation in data collection, monitoring and reporting on the performance of the irrigation system for efficiency and effectiveness
- b) Active participation monitoring and reporting of any identified system disrepair
- c) Active participation in reporting on the illegal off taking through pumping, destroying gates, bursting or breakage of pipes etc.
- d) Notify/report a serious damage to irrigation facilities caused by human action such as illegal off taking or careless operation of irrigation facilities.
- e) Notify/report on irrigation water conflict due to demand and participate in facilitating solutions to such a problem.

IWUA ORGANIZATIONAL STRUCTURE.

Levels of O&M activities between IWUA and the NIB.

- ✓ NIB role: development of major irrigation and drainage infrastructure i.e weir, main canal, secondary canals, tertiary canals, main and secondary drrujains, roads, road bridges and foot bridges, box culverts and pipe culverts, offices and buildings.
- ✓ NIB will play the role of irrigation water service provider where it will supply water to the IWUA who shall in turn take responsibility for water distribution to individual farmers.
- ✓ IWUA role: Maintenance of tertiary canals, tertiary drains and field canals through vegetation slashing and clearing and minor desilting.
- ✓ It should be noted that once the IWUA capacity has been improved, part of the functions played by the national agency NIB will be transferred to the IWUA.

Challenges in Irrigation Systems Management.

- Inadequate Capacity. Trainings and visits
- Poor water distribution. Improve on planning and water control infrastructure
- Vandalism. Impose hefty penalties

- Weak bylaws make water management a challenge due to noncompliance.
- Water Theft and Wastage: Impose hefty penalties.
- One weakness of conventional operation is the inevitable discrepancy between forecast and actual delivery flows
- Inaccuracies in checking the flow and the amount of water stored in the canal pools resulting in over or under irrigation especially at the Tail End farms.

Irrigation normally involve different organizations working together for the common good, that is enhancing agricultural production through irrigation. Proper management of these organizations is paramount to ensure project objectives are achieved.

Irrigation also involves complicated operations.

Irrigation has more conflict. There is more likelihood of conflicts between farmers, farmers groups , farmers and the management etc.

Obtaining payment from the farmers.

Irrigation water demand may exceed supply

5.7: CROPING CALENDAR.

GENERAL OBJECTIVES OF THE SESSION

At the end of the session, the participants should understand Irrigation System Management in relation to Agricultural Production

SPECIFIC OBJECTIVES OF THE SESSION

At the end of this session the participants should be able to:-

1. To discuss ways of managing activities in the Cropping calendar.
2. Discuss strategies for synchronization of Cropping Programmes/Calendars with Irrigation System Management.
3. To explain the role IWUA in agricultural extension.
4. Discuss Environmental monitoring, M&E data: irrigation efficiencies, water quality, Catchment Protection, Environmental Audit, their importance in Water Conflict Management and in compliance with existing laws EMCA, Water Act .Worker - Health Safety and Welfare for sustainable agriculture.

MAIN CONTENT OF THE SESSION (SUBJECT MATTERS).

SESSION PLAN (SESSION FLOW)

6. Cropping Calendar activities.
7. Strategies for synchronizing Cropping Programs with Irrigation Systems Management
8. Role of IWUA in Agricultural Extension.
9. Environmental Monitoring in Irrigation.

METHODOLOGY: Enhanced Lecture, Small Group Task, Field Demonstrations/Visits, Plenary Presentation.

TIME ALLOCATION: 5 ½ Hours

RESOURCE MATERIALS

5.8 Session 8: Agricultural Production and Irrigation System Management.

Cropping Calendar:

Incorporates all activities involved in the production process or cycle from:

- Land preparation. i.e 1st Ploughing, 2nd Ploughing, Hurrowing, 1st rotavation etc.
- Acquisition of inputs: Fertilizer, seed, pest control chemicals, finances, water etc
- Irrigation Scheduling: Flooding, 1st top up, 2nd top up
- Crop stages: Should factor crop stages for ease of crop management i.e. transplanting, 1st weeding, 1st fertilizer application, Spraying Pest Control & Fungicides. This will in turn facilitate extension services as the staff involved are able to closely monitor the crop stages and are able to respond to the particular agronomical needs at the time. This also assists in irrigation schedule as the plants can be irrigated based on their development stage.

Strategies of Synchronizing Cropping Programmes/Calendars with Irrigation System Management.

- Cropping Program to be developed in consultation with all farmers and their different organizations to promote ownership and reduce on water conflicts.
- The Cropping programs should be broken down to individual activities to facilitate monitoring of the Program.

Role of IWUA in Agricultural Extension:

Agricultural extension is the application of scientific research and new knowledge to agricultural practices through farmer education. The IWUA play a critical role in Agricultural extension since they advise the farmer on the appropriate water management techniques and technologies. This not only translates to improved production yields as crops are grown at optimal conditions but also helps conserve water and reduce on environmental degradation.

Key Points: Efficient water management translating to:

- Improved yields.
- Water conservation.
- Reduced environmental degradation.

Discuss Environmental monitoring, M&E data: irrigation efficiencies, water quality, Catchment Protection, Environmental Audit, their importance in Water Conflict Management and in compliance with existing laws EMCA, Water Act .Worker - Health Safety and Welfare for sustainable agriculture.

Environmental Monitoring.

Environmental Monitoring in Irrigation aims to address long-term sustainability of the Irrigation development and conservation goals. The IWUA being the main body that address water management in a scheme, therefore take the lead role in Environmental Monitoring within the Scheme. The activities involved in irrigation environmental monitoring include:

- Monitoring of Irrigation Efficiency: Water being a scarce resource there is need to conserve it through prudent water management a role that is principally played by the IWUA. Efficient water use not only translates to water conservation but part of the Water tariff charges imposed by the regulatory body WARMA.
- Water Quality monitoring.
- Soil quality monitoring.
- Monitoring of effluent from irrigation areas for pollutants particularly: Pesticides and any other farm chemicals that may be hazardous to aquatic life and flora fauna downstream.
- Monitoring of Pests and Diseases: both occurrence and spread.
- Monitoring of salinity and sodicity.
- Monitoring for Water Borne diseases such as Bilhazia, Malaria, cholera in order to come up with mitigation measures against disease outbreaks

M&E DATA.

The set of data and information gathered or monitored for managing the O &M of irrigation is enumerated below in sets of data and information:

- Farming activities and cropping: These include name of farmers, lot numbers, area planted, kind and variety of crop planted and dates of sowing and planting.

When processed and analyze, these data provide the actual cropping program/calendar of an irrigation unit that will in turn provide information and data on:

- Irrigation Schedule: area to be irrigated including the crop growth stage on a weekly basis during the remaining period of the cropping season.

- Start and end of different farming activities, growth stages of crops, terminal drainage and harvesting in an irrigation unit/block.
- Water Distribution Reports: provides information on delivery and distribution of Irrigation Water. These may include discharge measurements at source or major control points such as head gates of main canal and laterals and turnouts, as well as data on rainfall and evaporation.

When Processed and analyzed this set of data and information provides information on:

- Estimated discharge flow at the source.
- Estimates on the use of irrigation water during the previous week.
- Adequacy and equitability of delivery and distribution in the irrigation units
- Irrigation units to be provided with additional irrigation water to minimize the effects of the previous inadequate supply.

The Maintenance Schedule provides information on the condition of irrigation facilities and structures: This is a set of data or information on the number of structures, kind, extent and measurements of damages and condition of irrigation facilities and structures. When processed and analyzed these data provide information on the :

- Estimates on the costs of repair of the damaged facilities and structures.
- Structures and facilities that need immediate repair(emergency) and those that need to be changed.
- The repair work that can be done by the farmers and those that will require technical guidance from NIB.

Status of O&M payment report.

This includes data or information on O&M Fee collectibles and the actual collection on current and back accounts by the IWUA. When analyzed this will in turn provide information on:

- Efficiencies on the collection of current and previous O&M payments.
- Strategies for improvement of collection.
- Estimates of pending collection

The Trainer should enumerate the various M&E Data in Irrigation:

- Water Distribution Reports which include amount of water abstracted, amount distrusted.
- Water quality at specific points in the conveyance system.
- Yield per volume of water consumed.
- Amount of electricity consumed in Pumping.

- Cost of Operation and Maintenance against set targets/Budgets.
- Production reports:

Environmental Audit and Monitoring

The Environmental Audit and Monitoring arises from the Environmental Impact Assessment done at the Planning phase of the Project.

The following is a table of environmental concerns that may arise from an Irrigation Development Project:

Major impacts of irrigation projects

Problem	Mitigation measures
Degradation of irrigated land	Improve I & D operation to match demand both 'how much & when'
Salinization	Provide drainage including disposal of water to evaporation ponds or the sea if quality of river flow adversely affected by drainage water.
Alkalization	Maintain channels to prevent seepage, and reduce inefficiencies resulting from siltation and weeds. Allow for access to channels for maintenance in design.
Waterlogging	Provide water for leaching as a specific operation.
Soil acidification	Set-up or adjust irrigation management infrastructure to ensure sufficient income to maintain both the irrigation and drainage systems.
	Analyze soils and monitor changes so that potential problems can be managed.
Reduced socio-economic conditions:	Manage I & D to prevent disease spread.
Increased incidence of water related disease	Educate the farmers about causes of disease.
Increased inequity	Improve health facilities.
Weaker community infrastructure	Allow sufficient time and money for extensive public participation to ensure that plans are optimal, that all sections of affected society are considered and that local institutions are in place to sustain irrigated agriculture, particularly in respect of land and

	water rights.
	Consider markets, financial services and agricultural extension in conjunction with proposed irrigation and drainage changes.
	Ensure that agricultural intensification does not preclude other economic or subsistence activity, such as household vegetables, fodder or growing trees for firewood.
	Provide short-term support and/or skills for an alternative livelihood if irrigation removes existing livelihood
Poor water quality:	Define and enforce return water quality levels (including monitoring).
Reduction in irrigation water quality	Control industrial development.
Water quality problems for downstream users caused by irrigation return flow quality	Designate land for saline water disposal; build separate disposal channels.
Safe use of Pesticides	- Educate for pesticide or sewage contamination dangers.
	Monitor irrigation water quality
Ecological degradation:	- Define ecological requirements.
Reduced big-diversity in project area	Operate dams to suit downstream requirements and encourage wildlife around reservoirs (see Sections 4.1.3 and 4.5).
Damage to downstream ecosystems due to reduced water quantity and quality	Designate land (in law and supported by protection institutions) for flood plains; wetlands; watersheds; drainage water disposal; river corridors.
Ground water depletion:	Define and enforce abstraction regulations.
Dry drinking & irrigation wells	- Designate land (in law and supported by protection institutions) for flood plains; wetlands; watersheds; drainage water disposal; river corridors.
Saline intrusion at coasts	Adjust abstraction charges
Reduced base flow/wetlands	

5.9 SESSION 9: BUDGETING FOR O&M AND PAYMENT OF IRRIGATION SERVICE FEE

GENERAL OBJECTIVES OF THE SESSION

At the end of the session, the participants should understand the concept of budgeting for O&M and importance of payment of Irrigation Service Fee.

SPECIFIC OBJECTIVES OF THE SESSION

At the end of this session the participants should:-

- i. Understand the cost elements of O&M of an Irrigation System.
- ii. Understand the importance of the Irrigation Service Fee.
- iii. Demonstrate ability to calculate levy and collect Irrigation service fee.
- iv. Understand the management of Irrigation Service fee collection and proper record keeping.
- v. Understand the Irrigation Service fee in relation to IWUA budget.
- vi. Demonstrate the ability to prepare IWUA and O&M Budget.
 - i. Understand Monitoring and Evaluation in Irrigation Systems Management.

MAIN CONTENT OF THE SESSION (SUBJECT MATTERS)

1. O&M in irrigation systems management
2. Monitoring and Evaluation in irrigation systems management

SESSION PLAN (SESSION FLOW)

A. O&M IN IRRIGATION SYSTEMS MANAGEMENT

- i. Definition of O&M fee
- ii. Importance of the levying O&M fees
- iii. Methods of determining O&M fee
- iv. O&M Costs
- v. O&M budgeting
- vi. O&M fee collection
- vii. Procedures for collection
- viii. Structure for collection of O&M fee
- ix. Rules for O&M collection
- x. Incentives for O&M collection
- xi. Transparency and accountability in O&M collection and management

B. MONITORING AND EVALUATION IN IRRIGATION SYSTEMS MANAGEMENT

- i. Introduction
- ii. Participatory monitoring and evaluation
- iii. Importance of PM&E

iv. Steps in PM&E

v. Proposal of PM&E systems for IWUAs

METHODOLOGY: Enhanced Lecture, Small Group Task, Plenary Presentation

TIME ALLOCATION: 4 Hours

RESOURCE MATERIALS

Definition of O&M fee

O&M fees are payments that an irrigation water beneficiary makes for the irrigation service. The charge may be levied based on acreage, volume of water supplied or based on crop. O&M fee is levied to ALL farmers within an irrigation scheme.

The revenue collected under this fund is used to cater for scheme's O&M costs, for example, paying the IWUA employed staff (both for operations and maintenance), purchasing maintenance and repair items, paying for WRMA bills and conducting annual environmental audits.

Importance of levying O&M fees

O&M fees are levied to farmers for the following reasons:

1. Service delivery – cost and accountability
 - To cover the costs of providing the service i.e. Operation costs, WRMA NEMA and WRUA costs
 - To fund adequate maintenance of infrastructure, preserving its productive function

2. Demand management, water allocation and environmental management
 - To reduce excess water demand
 - To provide an incentive for the efficient use of scarce water resources
 - To allocate water to the highest priority uses
 - To provide incentives to improve water quality and protect environment
 - To encourage proper farming decisions by the farmers

3. Social objectives
 - To ensure equity of access to water or the benefits of its use

Methods of determining O&M fee

O&M Costs

These are divided into Operation, Maintenance and WRMA Costs

Operation costs

These are the costs that are related to the actual operation/manipulation of the irrigation scheme. These include:-

- Stationery
- Salaries payable to the water guards/technicians as determined in the IWUA bylaws
- Allowances payable in accordance to the IWUA bylaws
- Telephone costs incurred during scheme operation
- Travel costs related to scheme operation e.g. Motorbike costs
- Monitoring expenses

Example of operation costs

S/No	Item	Unit	Rate per month 'Kshs'	Total per year 'Kshs'
1	Stationery	Lump sum	2,000	12,000
2	Salaries (as per by laws)	2	5,000	120,000

3	Allowances (as determined in the bylaws	Lump sum	2,200	26,400
4	Telephone costs	Lump sum	2,000	24,000
5	Travel costs	Lump sum	4,000	48,000
6	Electricity costs/diesel costs (applicable for pump-fed scheme)	Lump sum	10,000	120,000
7	Monitoring expenses	Lump sum	1,000	12,000
	Sub-total			
	Total number of farmers		252 farmers	
	Amount to be contributed per farmer per year			
	Amount to be contributed per farmer per month			

Maintenance costs

These are the costs that are related to maintenance works of the irrigation scheme. These include but are not limited to:-

- Repair of weir body
- De-silting, reshaping & backfilling of banks at the intake
- Greasing and oiling of gates
- Painting of iron parts of gates
- Repair of drainage structures
- Repairs of road crossings and bridges
- Repair of water storage structures
- Purchase of repair pipes, maintenance tools and implements
- Hire of equipment and machinery e.g. excavators for de-silting the intake
- Hire of skilled labourers i.e. masons, plumbers etc.

Example of Maintenance costs

S/ No	Item	Unit	Rate per month 'Kshs'
1	Repair of weir body	Lump sum	15,000
2	De-silting, reshaping and backfilling of banks	Lump sum	10,000
3	Greasing and oiling of gates	Lump-sum	10,000
4	Painting of iron parts of gates	Lump-	5,000

		sum	
5	Repair of drainage structures	Lump-sum	6,000
6	Protection of earthworks for canal banks	Lump-sum	2,000
7	Repairs of road crossings and bridges	Lump-sum	2,500
8	Repair of water storage structures	Lump-sum	6,500
9	Purchase of repair pipes	Lump-sum	8,000
10	Purchase of maintenance tools and implements	Lump-sum	4,000
11	Hire of equipment and machinery e.g. excavators for desilting the intake	Lump-sum	
12	Hire of skilled labourers i.e. masons, plumbers etc.	Lump-sum	5,000
	Sub-total		
	Total number of farmers		252 farmers
	Amount to be contributed per farmer per year		
	Amount to be contributed per farmer per month		

WRMA water charges

- WRMA was established through a Gazette Notice No, 8140 of 14th November 2003 to be the lead agency with respect to water resources management in Kenya. According WRM rules, a person or an institution in possession of a valid Permit or who is required to have a valid permit for water use shall be required to pay to WRMA water use charges on the basis of water abstracted, diverted, obstructed or used including energy derived from a water resource.
- There are penalties for OVER ABSTRACTION (if you abstract beyond what you were permitted). There are also penalties for lack of measuring devices. The schedule below highlights the various classes of water use and the respective applicable rate.

1st Schedule of water charges

Type of Water Use	Criteria	Rate
Domestic, Public, Livestock	Domestic, Public & Livestock purposes	50cents/m ³
Irrigation	First 300m ³ /day	50cents/m ³
	Over 300m ³ /day	75cents/m ³
Fish Farming	Amount of water supplied	5cents/m ³
Commercial/Industrial	First 300m ³ /day	50cents/m ³
	Over 300m ³ /day	75cents/m ³
Effluent Discharge		10cents/m ³

Sample calculation of water

Example Calculation: Determination of WRMA costs

If the Scheme abstracts 10,000 cubic meters of water daily, per month, the total water abstraction is 300,000 cubic meters.

For the first 300m³ charges is Kshs. 0.50 per m³

Additional volume of water consumed is charged 0.75m³

The charges will thus be calculated as follows:

$$\text{First } 300\text{m}^3: (300 \times 0.5) = 150.00$$

$$\text{The balance } 299,700\text{m}^3 = (299,700 \times 0.75) = 224,775.00$$

Total cost per month= 224,775.00

Total cost per year= (12 x 224,775)= 2,697,300.00

Number of farmers= 300

Total cost per year per farmer=8,991.00

Total cost per month per farmer=299.70

TOTAL O&M COST FEE PER FARMER = (OPERATIONAL + MAINTENANCE + WRMA COSTS)

O&M Budgeting

For system operation costs, the annual costs are determined based on the system operation plans. Most of the operational costs are fixed and therefore these are cumulated annually.

The system maintenance requirements for a coming year are assessed on the basis of a walk-through survey, which involves an inventory of damage to the system. This survey may be carried out at local level in a joint walk-through with water users (if necessary), in consultation with the irrigation extension office.

Sample O&M budget

Items	Units	Quantity	Budgeted Amount	Actual Amount	Variance
i. Operational costs					
Salaries or allowance payable to the water guards					
Sitting allowance for the O&M sub-committee					
Stationery for recording on water distribution and any other data that may be required					
Monitoring expenses					
WRMA water bills					
Sub-total					
ii. Irrigation Structures					
Rehabilitation of the Intake weir/related structures					
Greasing of the gates and related structures					
Painting of iron parts					
Repairs of gates valves and division boxes					
Cleaning of sediments from the canal/pipeline intake					
Sub-total					
iii. Canal/pipeline network					
Repairs of structures					
Repair of road crossing and bridges					
Purchase of repair pipes					
Purchase of maintenance tools and implements					
Hire of skilled labourers i.e. masons, plumbers,, technicians					
Sub-total					
GRAND TOTAL					

O&M fee collection

The ultimate responsibility of handling all IWUA finances lies with the Treasurer, who is in turn accountable to the management committee and ultimately to the general assembly.

The treasurer, however, may not have the capacity to handle all the procedures relating to collection of IWUA finances including the O&M fee. Mechanisms, therefore, should be put in place that would ensure ease of collection and remitting of the O&M fee.

It is advisable that the IWUA open an O&M bank account where all the monies from the O&M fee would be remitted so that this money is NOT diverted to other IWUA expenses.

A clearly understood and agreed water fee structure should include: how fees are computed; how the fees are billed, when fees are to be paid; penalties for non-payment or late payment of fees; mechanism for fee payment (to whom, and how).

Records of billing, collection and non-payment should be well documented.

There are many reasons why irrigation charges are not paid, some of which are not the fault of water users.

Non-payment may be the result of:

1. Poor methods of collection,
2. Incorrect billing,
3. Non-delivery of bills or
4. Other mistakes in the collection administration.

In MOST cases, however, non-payment stems from the absence of effective sanctions.

There are three categories of sanctions:

1. Penalties,
2. Legal action and
3. Suspension of water deliveries.

The latter is the most powerful sanction though it may be culturally a sensitive issue in some communities.

Procedures for collection

The first step towards collection of water fee is opening of bank account in the name of the IWUA where the funds for O&M are deposited after collection.

There are different ways through which the IWUA can collect O&M fee including

- (1) Through the block leaders,

- (2) Through the O&M fee sub-committee,
- (3) Self-collection where every member is expected to deposit the money into the bank account and submit the deposit slip for receipt issuance
- (4) Through the treasurer of the scheme (every member takes the money to the treasurer and is issued with a receipt).

Structure for collection of O&M fee

Rules for O&M fee collection

- The management committee in collaboration with the O&M fee sub-committee shall from time to time set the O&M fee taking consideration of WRMA fees, O&M costs and other IWUA costs related to scheme O&M
- No water shall be delivered unless the charges are paid, conditions observed and restrictions complied with
- Payment of the O&M fee shall be through own-deposit in the IWUA bank /direct cash remittance/mobile transfer (*Only one method should be agreed upon and not a combination of many methods of remittance*)
- The member after submission of the deposit slip must be given an official receipt. Temporary receipts will not be honored
- The official receipt issued should be made only to the name of the IWUA member
- Payment of irrigation dues shall be applied on the following order
 - Penalties
 - Past dues
 - Current dues
- No payment shall be applied to past dues without first fully paying the penalties

Incentives for O&M fee collection

An incentive is something that incites or tends to incite to action or greater effort, as a reward offered for increased productivity. In O&M fee collection, farmers can be encouraged to voluntarily adopt the payment of the O&M fee through the use of incentives.

IWUAs should monitor the rate of O&M fee collection on individual basis with a view to determine those who pay on time, late or even those who don't pay at all.

The various incentives that the IWUA can consider giving to the farmers who are compliant include:

1. Exemption from a day's communal work
2. Cash discount on prompt payment
3. Increased irrigation hours
4. Increased irrigation acreage

Transparency and Accountability in O&M fee collection and management

For an IWUA to be successful and sustainable it will need to keep transparent and accountable records of irrigation service fees. This is crucial for the legitimacy of the IWUA and to ensure farmers willingness to pay for services. In relation to O&M fee, the IWUA is expected to be transparent in determination of the O&M fee. It is necessary to get consensus of the fee in a general meeting. Records of collection and utilization of the water fee should be maintained and made available to IWUA members upon request. The IWUA should be guided by the agreed O&M budget. Major variations should be approved in a general meeting. It is also prudent for the IWUA to have their books audited once a year and financial statements prepared for presentation to the rest of the members during the AGM

MONITORING AND EVALUATION IN IRRIGATION SYSTEMS MANAGEMENT

Introduction

When the IWUAs are fully involved in the project monitoring and evaluation they are able to chart their way forward and be responsible for their destiny.

Monitoring is a systematic and continuous collection and analysis of data about the progress of a piece of work over time, to identify strengths and weaknesses and for providing the IWUAs with sufficient information to make the decisions at the right time to improve its quality.

Evaluation is a systematic process that objectively determines the relevance, effectiveness, efficiency, sustainability and impact of activities in the light of specified objectives in the project-planning matrix.

Evaluations are usually based on general questions e.g.

- What activities took place?
- Did the activities achieve objectives?
- How can future efforts be improved?

Participatory monitoring and evaluation

It is the process of community self-assessment whereby local people are involved in program planning, implementation, monitoring and evaluation as the main actors.

The following principles are used:

- Participation
- Negotiation
- Learning

Importance of PM&E

Participatory monitoring and evaluation creates ownership of the whole process, its importance is manifested in the following ways:

- Achieves a more rounded perspective
- Derives support from a broader base of Knowledge, expertise and resources
- Validity is enhanced through its multiple sources
- Accommodates the diverse interest of those involved
- Becomes ethically sound since it involves those affected by its outcomes
 - Supports and extends participatory models of development initiatives
 - Empowers communities, organizations and individuals to analyse and solve their own problems
 - Values the knowledge and experience of local communities
 - Promotes reflection and critical analysis by all stakeholders
 - Promotes ownership by stakeholders (mainly beneficiaries)
 - Improves the quality of the current project through proper operation and management
 - Improves the quality of the other projects by utilization of the experience gained in ongoing projects by drawing lessons from them.
 - Improves transparency through clarification of the outcome of fund injection to fund providers and supporters such as taxpayers and members of the funding organizations and contributions.

Steps in participatory monitoring and evaluation

A sound monitoring system has to be established prior to project implementation, taking the following into account:

- Information to be collected (compare plan of operations and project design matrix)
- Information collectors, times of collection and collection methods, e.g. through questionnaires, interviews or observations.
- Information aggregator, times of aggregation and aggregation methods
- Decision maker and times of decision making
- Methods and times of decision notification and feedback

Steps in Monitoring

The following are the procedures that should be used:

- Identify all stakeholders that are to participate
- Draw terms of reference and discuss criteria to be used

- Formulate indicators
- Formulate data collection sheets
- Collect data
- Analyse and aggregate data
- Participate in report writing

Give feedback to all stakeholders*Steps in Evaluation*

The following are the steps in planning and conducting an evaluation.

- Prepare PDM (E) and narrative summary for evaluation
- Design evaluation questionnaire, select data collection methods etc.
- Collect and sort results
- Draw conclusions and lessons learnt from evaluation
- Give feedback to stakeholders

Proposal of PM&E system for IWUAs

It is very necessary for IWUAs to have an inbuilt system for monitoring and evaluation where all the members are involved. This will provide feedback regularly to all stakeholders.

The following table is a proposed format for IWUA monitoring and evaluation

Proposed IWUA Participatory Monitoring Format.

OUTPUT 1: WELL-FORMED IWUA						
Activity	OVI	Means of Verification	Time Frame	Inputs	Result	Expected Outcome
Create awareness in community	Number of sensitisation meetings	Minutes of meetings	Within 1 st month	<ul style="list-style-type: none"> Facilitator Community 		
Recruit members	Number of people registered	List of people registered	Within 1 st 3 months	<ul style="list-style-type: none"> Facilitator Community Interim committee 		
Identify objectives	Well defined objectives	List of prioritised objectives	Within 1 st 3 months	<ul style="list-style-type: none"> Facilitator Tentative members 		
Formulate by-laws	Number of clauses/articles deliberated and agreed upon	Set of by-laws (document)	Within 1 st 4 months	<ul style="list-style-type: none"> Facilitator Tentative members 		
Conduct Elections	Number of officials elected	Minutes of meetings	Within 1 st 4 months	<ul style="list-style-type: none"> Facilitator Tentative 		
Register IWUA Members	Number of registered members	Registration certificate	Within 1 st 5 months	<ul style="list-style-type: none"> Registration fee Committee Registration agency 		

Conduct initial training	<ul style="list-style-type: none"> • Number of trainings conducted • Number of members trained 	Training reports	Within 1 st 5 months	<ul style="list-style-type: none"> • Resource persons • Finances • Members • Equipment 	
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OUTPUT 2: PROJECT PLANS

Activity	OVI	Means of Verification	Time Frame	Inputs	Result
Participate in feasibility studies	Number of investigations and surveys done	<ul style="list-style-type: none"> • Feasibility study report 	Within 1 st year	<ul style="list-style-type: none"> • Technical Personnel • Members • Funds • Reference materials • Equipment 	
Participate in project design	Number of design meetings	<ul style="list-style-type: none"> • Minutes of meetings • Design report 	Within 1 ½ years	<ul style="list-style-type: none"> • Technical Personnel • Members • Funds • Equipment 	

OUTPUT 3: PARTICIPATION IN PROJECT IMPLEMENTATION

Activity	OVI	Means of Verification	Time Frame	Inputs	Result
Mobilise resources	<ul style="list-style-type: none"> • Amount of money raised • Number of 	<ul style="list-style-type: none"> • IWUA bank statement • List of 	Within 2 years	<ul style="list-style-type: none"> • Members • Stakeholders 	

	<p>members who contribute</p> <ul style="list-style-type: none"> Types & quantities of resources raised 	<p>contributors</p> <ul style="list-style-type: none"> Materials on site 			
Participate in tendering process	<ul style="list-style-type: none"> Number of contracts drawn Numbers of tenders submitted and evaluated Number of members who participated 	<ul style="list-style-type: none"> Tender documents Evaluation reports 	Within 2 years	<ul style="list-style-type: none"> Technical Personnel Members Funds Stakeholders 	
Participate in construction works	<ul style="list-style-type: none"> No of contracts awarded Number of structures constructed Number of members participating 	<ul style="list-style-type: none"> Implementation reports Communal work schedules List of participating members 	Within 3 years	<ul style="list-style-type: none"> Technical Personnel Members Funds Stakeholders materials 	
Participate in system testing	<ul style="list-style-type: none"> Number of test runs Duration of testing Number of complaints about system Number of complaints attended 	<ul style="list-style-type: none"> System performance report List of complaints 	Within 3 ½ years	<ul style="list-style-type: none"> Technical Personnel Members Funds Stakeholders 	

	to			<ul style="list-style-type: none"> Contractor 	
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OUTPUT 4: PARTICIPATION IN OPERATION & MAINTENANCE

Activity	OVI	Means of Verification	Time Frame	Inputs	Results
Draw O&M schedules	No of activities plans No of planning meetings	O&M schedules Minutes of meetings	Annual	<ul style="list-style-type: none"> Members Facilitators Technicians 	
Establish O&M funds	No of contributors Amount of contribution No of source identified	Bank statement /account Audit statement Balance sheet	Within 3 ½ years	<ul style="list-style-type: none"> Members Stakeholders Finances Banking institutions 	
Carry out O&M activities	No of O&M activities carried out	O&M reports	Continuous	<ul style="list-style-type: none"> Members Stakeholders Finances Equipment Spares Technicians 	

OUTPUT 5 SCHEME MEETINGS

Activity	OVI	Means of Verification	Time Frame	Inputs	Results
Hold general meeting	No of meetings held Agenda of meeting No of participants	Minutes of general meetings	As per by laws	<ul style="list-style-type: none"> Members Stakeholders 	
Hold committee	No of meetings held	Minutes of	As per by	<ul style="list-style-type: none"> Members 	

meetings	Agenda of meeting No of participants	general meetings	laws	<ul style="list-style-type: none"> Stakeholders 	
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OUT PUT 6 NETWORKING

Activity	OVI	Means of Verification	Time Frame	Inputs	Results
Inventorize stakeholders and their roles	No of stakeholder inventoried	List of stakeholders	Annually	<ul style="list-style-type: none"> Members Stakeholders Facilitators 	
Hold Stakeholder consultative for a and Share information	No of stakeholder forums held No of stakeholders contacted No of correspondences	IWUA reports Minutes of forum	Continuous	<ul style="list-style-type: none"> Members Stakeholders Facilitators Finances 	
Undertake visits and tours (education)	No of tours /visits undertaken No of innovations identified and adopted No of participants	Visit report List of participant Adoption report	Continuous	<ul style="list-style-type: none"> Funds Transport Members Stakeholders Facilitators 	

OUTPUT 7 TRAINING

Activity	OVI	Means of Verification	Time Frame	Inputs	Results
Assess training needs	No of needs identified No of members consulted No of training	Training needs assessment report	Annually	<ul style="list-style-type: none"> Facilitators Members 	

	schedules made No of courses planned				
Mobilize Training resources	Budget Amount of funds raised No of resource persons identified	Resource mobilization report List of contributors List of resource people Bank statement	Annually	<ul style="list-style-type: none"> • Members • Stakeholders 	
Participate in training	No of participant No of courses held	Training reports	Annually	<ul style="list-style-type: none"> • Members • Resource persons • Funds • Equipment • Venue 	

Output 8 Participation in monitoring and evaluation

Activity	OVI	Means of Verification	Time Frame	Inputs	Results
Participate in monitoring activities	No of members involved No of activities monitored	Monitoring reports	As per monitoring schedules	<ul style="list-style-type: none"> • Members • Facilitators • Finances 	
Act on recommendations	No of recommendations implemented No of recommendations not acted on	Implementation report	As per schedule	<ul style="list-style-type: none"> • Members • Facilitators • Stakeholders • Funds 	

Proposed participatory evaluation system for IWUAs

Objective	OVI	Means of Verification	Inputs	Res
1. To promote active participation by all members in IWUA activities	<ul style="list-style-type: none"> • % Members contributing resources for IWUA activities • % Members participating in IWUA activities • Proportion of external /internal resources for IWUA activities 	<ul style="list-style-type: none"> • IWUA reports • Financial records • Monitoring reports 	<ul style="list-style-type: none"> • Members • Facilitators • Stakeholders • Funds 	
2. To facilitate pooling of members resources for irrigation/drainage development	<ul style="list-style-type: none"> • % of members contributing • amount of resources contributed by members • No of communal activities undertaken 	<ul style="list-style-type: none"> • IWUA financial records • IWUAs communal work register • Monitoring reports 	<ul style="list-style-type: none"> • Members • Facilitators • Stakeholders • Funds 	
3. To provide adequate irrigation water to members	<ul style="list-style-type: none"> • % of plots getting water • No of reported water related conflict 	<ul style="list-style-type: none"> • Scheme /IWUA reports • Monitoring reports 	<ul style="list-style-type: none"> • Members • Facilitators • Funds • Stakeholders 	
4. To provide effective drainage system to	<ul style="list-style-type: none"> • % of well drained plots • % change in yield levels before and after installation of the 	<ul style="list-style-type: none"> • IWUA reports • Survey reports • MOALD reports • Monitoring 	<ul style="list-style-type: none"> • Members • Facilitators • Funds 	

members	drainage system	reports	<ul style="list-style-type: none"> Stakeholders 	
5. To ensure proper operation and maintenance of irrigation/drainage	<ul style="list-style-type: none"> % of members accessing water as schedule Physical state of the irrigation infrastructure Frequency of maintenance of works No of reported faults / breakages 	<ul style="list-style-type: none"> IWUA reports Survey reports Monitoring reports Maintenance /repair report 	<ul style="list-style-type: none"> Members Facilitators Funds Stakeholders Technicians 	
6. To ensure successful Irrigated crop production	<ul style="list-style-type: none"> Production plans Area under Crop Increase in yields 	<ul style="list-style-type: none"> IWUA reports Production survey reports 	<ul style="list-style-type: none"> Members Stakeholders 	
7. To raise income levels of IWUA members	<ul style="list-style-type: none"> % of households that have improved their shelter % change in school enrolment rates 	<ul style="list-style-type: none"> IWUA reports School enrolment records Socio-economic surveys Observations 	<ul style="list-style-type: none"> Kenya Bureau of Statistics reports Members Funds 	
8. Ensure scheme sustainability measures	<ul style="list-style-type: none"> No of Environmental and social Impact assessment carried out % Implementation of Environmental management and monitoring Plans 	<ul style="list-style-type: none"> EIA report EMMP report EMMP action plans 	<ul style="list-style-type: none"> Members Stakeholders Funds 	

ANNEX.

TIME TABLE							
MODULE VI: IRRIGATION SYSTEM MANAGEMENT							
	8.30- 9.00 am	9.00-10.30 am		11.00-1.00 pm		2.00-4.00 pm	
Day 1	Registration	Introduction to Irrigation Systems Management	Tea Break	Designed Irrigation System	Lunch Break	Plenary/Group Work	Tea Break
Day 2	Registration	Planning for Irrigation Systems Management		Planning for Irrigation systems management		Plenary/Group Work	
Day 3	Registration	Operation of Irrigation Infrastructure		Maintenance of Irrigation Systems Infrastructure		Plenary/Group Work/Field visit	
Day 4	Registration	Agricultural Production and Irrigation Systems Management		Agricultural Production and Irrigation Systems Management		Plenary/Group Work	
Day 5	Registration	IWUA Organizational Structures for O&M		Budgeting for O&M and payment of Irrigation Service Fee		Plenary/Group Work/Closing Session	

MODULE VII: IRRIGATION MANAGEMENT TRANSFER (IMT)

Broad Objective:

To prepare participants for transfer of authority and responsibility of management of an Irrigation Project from Development Agency to IWUA to ensure sustainability.

Specific Objectives

- To understand the concept of Irrigation Management Transfer
- To understand the Current Irrigation Management Structure
- To understand IMT transfer processes and procedures.
- To understand IMT Agreements and Protocols
- i. To understand the importance of service agreements such as MOUs and their formulation.

Training Flow

- Introduction to the concept of Irrigation Management Transfer
- The Current Irrigation Management Structure
- IMT transfer processes and procedures.
- IMT Agreements and Protocols
- To understand the importance of service agreements such as MOUs and their formulation

Training Methodology

Lectures and group activities

Target Group

- IWUA leadership, stakeholders(County/National Government representatives, Institutions and water undertakers)

Training Timing

- This training should be held after the irrigation system construction commences

Session Duration

- The whole module will be covered in two hour per session in one to two days

Training Materials

- Flip charts, masking tape, felt/marker pens, note books , Biro pens, Projector

Training evaluation method

- Pre training and post training evaluation

Training Venues

- Community facilities namely: Church Halls, institutions, community halls, hotels

Number of Participants – Train in batches of 30 pax to reach targeted 150Pax

6.1 SESSION 1: INTRODUCTION TO IRRIGATION MANAGEMENT TRANSFER (IMT).

Specific objective

To understand the concept of irrigation management transfer.

Session objectives

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

- Define Participatory Irrigation Management and Irrigation Management Transfer.
- Discuss the justification for IMT.
- Outline elements of IMT.
- Discuss experiences and challenges in IMT

Session flow

- Participatory Irrigation Management and Irrigation Management Transfer.
 - Justification for IMT.
 - Elements of IMT.
 - Experiences and challenges in IMT
- **Define Participatory Irrigation Management and Irrigation Management Transfer.**

Participatory irrigation management (PIM)

- PIM-Involvement of irrigation stakeholders in carrying out a mutually planned activities to completion and in which the beneficiaries take part in decision making
- The term '**participatory irrigation management**' normally refers to the involvement of water users in irrigation management, along with the government/other development institutions.

- Generally, **Participatory Irrigation Management** can also be defined as the structured involvement of benefiting irrigation groups in the development and management of their projects/schemes.
- It has been recognised all over the world as an important tool for improving irrigation development and management to improve and enhance ownership and long-term sustainability of the systems/projects. This is attained by making explicit efforts to support local decision-making by granting legal authority and responsibility for managing their irrigation schemes and or sections of a larger scheme network.
- Irrigation management through participatory arrangements also provides a platform for local initiative and cultural diversity integration within the irrigation development.

Irrigation Management Transfer (IMT)

- Irrigation Management Transfer (IMT) can generally be defined as, the relocation of responsibility and authority for irrigation management from government agencies to non-governmental organizations, such as water users' associations. It may include all or partial transfer of management functions. It may include full or only partial authority.
- IMT is the gradual turning over of rights of ownership, authority and responsibility to operate and manage irrigation systems from governments to Irrigation Water Users Associations (IWUAs) or other non-governmental agencies. It can also be referred to as the process of devolvement of authority and responsibility from government agencies and or development agencies managing irrigation systems to farmers' organizations-Irrigation Water Users Associations (IWUAs). IMT therefore can be defined as the transfer of responsibility for irrigation management from one organization to another.

➤ **Discuss the justification for IMT**

Before a transfer policy can be adopted, planners must assess whether there is enough justification and support. Planners may need to answer the following questions:

- What are the main kinds of performance gaps in irrigated agriculture?
- How important are gaps?
- Is IMT necessary in order to overcome current management performance gaps?
- Will IMT be feasible to implement?
- Is there strong enough political commitment to IMT?

If planners decide it is important to overcome perceived gaps in performance, the next question becomes: “What actions are needed to overcome them?” There are two basic options: management enhancement or basic reform. Most of the governments that adopt irrigation management transfer reforms have already tried a series of improvement efforts but have found that the gaps in performance continue to widen.

➤ **Why IMT?**

IMT is necessary to :

- Eliminate recurring government expenditures for operation and maintenance of all irrigation systems which are transferred;
- Establish financially self-reliant water service providers to replace the public agency in the management of irrigation systems;
- Reduce the rate of deterioration of irrigation infrastructure;
- Provide transparency in management and accountability of the service provider to water users.

➤ **Why PIM?**

- The need to involve farmers participation in the scheme development
- The need to have cost sharing in development operation and maintenance
- The need for improved efficiency and effectiveness
- Transparency and accountability in the management of scheme resources
- Sustainability and environmental view
- Crop diversification

➤ **Outline elements of IMT**

- Capacity building and mobilisation
- Availability of legal policy framework
- Transfer agreement/ MOU
- Transfer of irrigation systems from state agency to IWUA
- Monitoring and evaluation framework

➤ **Discuss experiences and challenges in IMT**

- Management transfer which is partial or involves incomplete control by farmers leads to unstable management characterized by limited cost efficiency and staff accountability. Turnover is often partial, with agency staff continuing to exercise partial control over water distribution or budgets after turnover. This can create a false impression of failure which can

reinforce resistance to turnover policies.

- Turnover should be treated as an evolving program rather than as a short-term project with rigid quotas for turning over set numbers of systems per year.
- There is a frequent lack of strategic planning to reorient agencies and plan pro-actively for staff disposition prior to the implementation of turnover. This compounds agency resistance to turnover programs.
- Establishing motivating conditions for farmer organizations to take over irrigation management is more important than investing in efforts to motivate and train farmers
- Abuse of authority by functions after turnover is seen by less powerful farmers as a risk which is associated with management turnover. They may therefore seek continued agency involvement in auditing, regulating and helping to mediate conflicts.
- Rehabilitation is often done before turnover without meaningful farmer participation and investment. This can discourage farmers from taking over responsibility for the irrigation system after turnover. Farmer participation in system improvements prior to turnover can be an effective means of preparing farmers to take over long-term responsibility for irrigation systems.
- Farmer organizations seldom raise capital replacement funds after turnover. This can be a cause for concern about the long-term physical sustainability of irrigation systems after management is turned over to farmers, especially if it is questionable that governments will be able to afford to finance rehabilitation in future.
- Irrigation systems which were originally designed to be managed by trained engineers or technicians so as to maximize water use efficiency and flexibility of operation are often in compatible with the management capacities of farmers.
- Management transfer commonly involves increased cost to farmers for irrigated agriculture. Especially where farmers were not paying for the full cost of irrigation before turnover. This can be a disincentive for farmers to

take over management of irrigation systems.

- Strong high-level political support and support among farmers for management turnover is essential if agency resistance to turnover is to be overcome. It may not be advisable for policy makers to have resistant irrigation agencies implement turnover programs. Consideration should be given to having neutral organizations, such as NGOs or companies, implement turnover programs
- The complexity of the irrigation management structure that complicates the decision making process.
- Perception of the irrigation agency, irrigation management transfer as a potential threat to its bureaucratic power and existence.
- As an incapable government agent, the agency's role in management has to be reduced and paralleled by the empowerment of IWUAs. Yet, as a reform agent, the agency is responsible for the organisational development of IWUAs.
- The farmers' increased role and involvement in system management could potentially reduce the agency's decision-making authority and power.
- The irrigation agency, on the other hand, perceives the proposed management transfer as a potential threat to its bureaucratic power and existence. From the agency's perspective, farmers' increased role and involvement in system management could potentially reduce the agency's decision-making authority and power.
- Delegation of powers to formed structures (IWUAs) that have not been adequately prepared.
- Central in the IMT policy controversy is the way international donors and policy makers assume that government bureaucracy can be used as a policy instrument to achieve the defined policy objective. International donors perceive the idea of management transfer merely as a technical, managerial issue, rather than a political one.
- Created barriers such as the irrigation agency's lack of motivation to direct the process of management transfer; the WUAs' inability to fill in their new

role in systems management; the lack of coordination between the implementing agencies; the poor organizational performance of these agencies; and uncertain fund disbursement for IMT implementation.

- Lack of a clear task redefinition between government and farmers; a strong legal framework for IWUAs; good condition of irrigation infrastructure; and strong support from the government (INPIM, 1995:6).

6.2 SESSION 2: CURRENT IRRIGATION MANAGEMENT STRUCTURE.

Specific objective

To understand the Current Irrigation Management Structure.

Session objectives

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

- Explain the Current Irrigation Management Structure.
- Enumerate the roles, responsibilities & authority in the current management structure.
- Identify and discuss management GAPS in the current management setup.
- Identify and discuss stakeholders in IMT

Session flow

- Current Irrigation Management Structure.
- Roles, responsibilities & authority in the current management structure.
- Management GAPS in the current management setup.
- Stakeholders in IMT

➤ Irrigation management structure (IMS)

- IMS is simply defined, an **Irrigation Management Structure** refers to the organization of the hierarchy of authority, which defines accountability and communication channels within the organization and with its external environment.
- It outlines the roles of the top management, which consists of the CEO/Managers and the board, the middle management, which is made up of the department heads and heads of divisions within the organization, and the lower management, which is comprised of the line managers, team leaders and supervisors.

- Each organization has its unique management structure based on its operations, but the common denominator present in every organization's management structure is that it defines the flow of responsibility within an organization.
- This is the basic management structure used by most organizations and irrigators are also a part of the management structure.

Group activity One

Draw a sample of an IMS

➤ **Why is an irrigation management structure important?**

- IMS provides guidance to all concerned by laying out the official reporting relationships that govern the flow of the irrigation activities both horizontally and vertically.
- IMS is particularly important for consultation to facilitate decision making and effective communication at the various levels of the project.
- To get all those involved in the process (farmers, staff, and external government agencies) to work towards the achievement of the irrigation project's main objectives.
- To Guide the operation and maintenance activities and also on how to govern schemes with increased farmers' participation

➤ **Highlight the Current Irrigation Management Structure .**

- Agency managed systems
- Farmer managed irrigation schemes
- Participatory managed irrigation schemes

➤ **Enumerate the roles, responsibilities & authority in the current management structure.**

i. Agency managed systems

All responsibility is borne by the government and farmers have little role. Farmers are just mere beneficiaries and that project is a social service.

ii. Participatory managed irrigation schemes

Shares the responsibility between the agency and the farmers through their IWUA. The level of responsibility depends on the commitment of policy framework and the capacity of

farmers. This has proved to be the workable mode for most of the irrigation projects in Kenya.

iii. Farmer managed irrigation schemes

Management responsibility rested on farmers through IWUA. The agency role is advisory, provision of assistance when needed and regulatory functions.(Most of the projects under this category have collapsed)

➤ Identify and discuss management GAPS in the current management setup

Irrigation systems are the application of technology to extract water from its natural setting, to deliver and apply it to soils and/or crops for the purpose of agricultural production and to remove excess water and salts from the soil. There are four potential kinds of performance gaps that can occur with irrigation systems.

i. Technological performance gap.

This is when the infrastructure of an irrigation system lacks the capacity to deliver a given hydraulic performance standard. The normal solution to technology performance gaps is to change the type, design or condition of physical infrastructure.

ii. Performance gap

When a difference arises between how management procedures are supposed to be implemented and how they are actually implemented. This includes such problems as how people adjust gates, maintain canals and report information. This can be called a gap in implementation performance. A problem of this kind generally requires changes in procedures, supervision or training.

iii. Difference between management targets and actual achievements

Examples of management targets are the size of area served by irrigation in a given season, cropping intensity, irrigation efficiency, water delivery schedules and water fee collection rates. This can be called a gap in achievement. Such problems are generally addressed either by changing the objectives (especially simplifying them) or increasing the capacity of management to achieve them - such as through increasing the resources available or reforming organizations. To paraphrase the well-known management scientist, Peter Drucker, the question posed by an analysis of achievement gaps is, "Are we doing things right?"

iv. Impacts of management

This is a difference between what people think should be the ultimate effects of irrigation and what actually results. These are gaps in impact performance and include such measures as agricultural and economic profitability of irrigated agriculture, productivity per unit of water,

poverty alleviation and environmental problems such as waterlogging and salinity. If management procedures are being followed and targets are being achieved, but ultimate impacts are not as intended, then the problem is not that the managing organization has performed badly, since these effects are generally beyond its direct control. The problem is that the objectives of the organization do not produce the desired impacts. This is more a problem of policy than management. The question posed by an analysis of gaps in impact performance is (to rely on Drucker again), “Are we doing the right things?”

➤ **Identify and discuss stakeholders in IMT**

Stakeholders should include owners and cultivators of irrigated land, irrigation department staff, tax payers, policy-makers and planners in the water and agriculture sectors, technical assistance experts, agriculture crop processors, merchants and consumers. They may also include other people who desire access to water from the irrigation system for non-irrigation purposes (such as household uses, livestock, industry, power and so on), other water users at the basin level, agricultural cooperatives, labour unions, NGOs and environmental interest groups. There may be conflicting interests regarding IMT among stakeholders, such as between farmers at the head and tail reaches of canals. Head-enders may be satisfied with the irrigation service and not want to take over costs of irrigation. Tail-enders may want reform. The majority of farmers may favour taking over management but irrigation department staff may resist it for fear of losing jobs and revenue. Finance and planning departments may promote IMT to reduce the burden of financing irrigation. Wealthy farmers who may pay bribes for extra water may resist formation of strong water users’ associations.

6.3 SESSION 3: IMT TRANSFER PROCESSES AND PROCEDURES.

Specific objective

To understand IMT transfer processes and procedures

Session objectives

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

- Discuss the requirements for IMT (Policies, Legislation, and Capacity of the IWUA etc.)
- Discuss IMT options including potential functions for transfer.
- Discuss the IMT process and procedures.

Session flow

- Requirements for IMT (Policies, Legislation, and Capacity of the IWUA etc.)
- IMT options including potential functions for transfer.
- IMT process and procedures.

➤ Discuss the requirements for IMT

- Identification of changes to be made in public agencies, policy and legislation.
- Analysis of performance gaps, changes required and feasibility of IMT;
- Analysis of stakeholder participation options and capacity building
- Identification of units and functions to be transferred;
- Consolidation of above components into an IMT policy statement.

➤ Options for IMT

i. Partial transfer

Only limited infrastructure and responsibility is transferred to the farmers for example the tertiary canals

ii. Full transfer

All infrastructure and management functions are transferred to the farmers

➤ Discuss the IMT process and procedures

i. Mobilizing support for adoption of a transfer policy

This includes sensitizing the public and policymakers, and discussing, preparing and adopting a transfer policy statement. The process might stop here if there is not enough support for it, or if it is determined that it is the wrong time or place. If the decision is to proceed, then those involved in policy making, planning and implementation are directed through the subsequent phases.

ii. Strategic planning

This includes organizing the basic arrangements for the reform process. This may include formation of a coordinating committee, working group and issue groups and preparation of a concise strategic plan.

iii. Resolution of key policy issues

This need to be accomplished before planning for implementation commences. These are:

- How the irrigation sub-sector is going to be financed after irrigation management transfer;
- What legislative and sector-level restructuring is needed to support transfer;

- What management functions should be transferred
- What type of organization should take over management from the government.

iv. Planning and implementation.

These are combined for efficiency and because, in practice, planning is elaborated in the process of implementation. The key tasks in this phase are creating and strengthening water users' associations and water service providers, making improvements in irrigation infrastructure, carrying out monitoring and evaluation and adjusting plans in accordance with lessons learned during implementation.

6.4 SESSION 4: IMT AGREEMENTS AND PROTOCOLS

Specific objective

To understand IMT Agreements and Protocols

Session objectives

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

- Discuss IMT Agreements and Protocol.
- Explain the components of the IMT Agreements and Protocol.
- Demonstrate ability to negotiate and participate in the IMT agreements and Protocol.
- Discuss IMT timelines and M&E.

Session flow

- IMT Agreements and Protocol.
- Components of the IMT Agreements and Protocol.
- Ability to negotiate and participate in the IMT agreements and Protocol.
- IMT timelines and M&E.

➤ Define IMT Agreements and Protocol

This is an agreement that spells out the process, procedures, IMT option, responsibility and timelines.

➤ Explain the components of the IMT Agreements and Protocol

- Objectives and justification for the IMT policy;
- Existing policy and legal basis for the proposed IMT policy;
- Brief description of what kinds of irrigation systems or sub-systems will be transferred;

- Brief description of what management functions will be transferred;
 - Brief description of what new entities will take over management;
 - Brief description of what changes will be made in public agencies relative to IMT;
 - Identification of the organization to direct implementation;
 - Outline of suggested time-frame and mode of financing.
- **Demonstrate ability to negotiate and participate in the IMT agreements and Protocol.**

The following is a list of key areas of knowledge, skills and attitudes which are likely to be needed to formulate and adopt an irrigation management transfer programme.

i. Mobilization of support

- Knowledge on policy priorities in irrigation, agriculture, finance and planning, irrigation management performance gaps
- Skills on negotiation and persuasion, analytical and abstract reasoning, management performance assessment, oral and written presentation of ideas and data in a concise manner
- Attitudes-open to considering new ideas and solutions, broad-minded, hardworking, does not give up easily

ii. Strategic planning

- Knowledge on principles of strategic planning, perspectives of different stakeholders about IMT-related issues
- Skills on techniques of strategic planning, negotiation and persuasion.
- Attitudes- open to considering new ideas and solutions, broad-minded, hardworking, does not give up easily, perspectives and experiences of different stakeholders are an important resource

iii. Resolution of key policy issues

- Knowledge on institutional, managerial, financial and technical organization of irrigation subsector, management procedures and problems at the irrigation scheme and farm levels, local institutions for natural resource management: current and potential, legal aspects of IMT
- Skills on negotiation and persuasion, economic and policy analysis and abstract reasoning, relevant computer programs (statistical, spreadsheet, word processing), oral and written presentation of ideas and data in a concise manner

- Attitudes- open to considering new ideas and solutions, broad-minded hard working, does not give up easily, perspectives and experiences of different stakeholders are an important resource

iv. Planning and implementation

- Knowledge on multi-disciplinary and integrated planning methods, institutional, managerial, financial and technical organization of irrigation sub-sector, local institutions for natural resource management: current and potential, managerial capacity of implementers, management information systems, civil, hydraulic and agricultural engineering
- Skills on negotiation and persuasion, oral and written presentation of ideas and data in a concise manner, relevant computer programmes (project management, spreadsheets, database), group organizing methods, monitoring and evaluation methods, training needs assessment methods, design and construction of irrigation rehabilitation
- Attitudes- hard working, does not give up easily, perspectives and experiences of different stakeholders are an important resource, willing to adjust original ideas and approaches in response to what is being learned during implementation

Where the above kinds of knowledge, skills and attitudes are not available among staff who can be directly assigned to work on the management transfer programme, planners may have to recruit staff, obtain expertise through consulting contracts or organize training activities. Where training is needed at the field level, for agency field operations staff or farmers, experience suggests that on-the-job or learning-while-doing training and peer training.

➤ IMT timelines and M&E

As with any reform, IMT breaks new ground. IMT plans are like working hypotheses which need to be tested and modified in practice. Different stakeholders are involved and negotiation is an inherent part of the process. Irrigation schemes vary dramatically in their costs and degree of management intensity required to meet objectives. Feedback, learning and flexibility in programme implementation are essential, although they must be contained within the objective of achieving locally-sustainable irrigation management. It is easy to get bogged down in too much negotiating and deviation from the fundamental goal. Negotiation and flexibility must be constrained by the larger need: to implement a controversial reform within a reasonable timeframe despite political opposition. This requires keeping the momentum of change ahead of the resistance. It also requires keeping the basic structure of reform simple and clear to stakeholders.

Procedure of M& E

- Select indicators which are “information efficient”, meaning they describe a set of associated phenomena. A good indicator provides insights about multiple aspects, so there is no need to collect direct information about all related aspects.
- Distinguish between top- and bottom-directed needs for monitoring. Planners need top directed monitoring to compare actual with expected results. They, and other stakeholders, also need bottom-directed monitoring which conveys important information about unexpected and subjective issues that arise. This is at least as important as, and probably more important than, conventional top-down monitoring. To monitor only those things identified by central authorities severely restricts the learning process. The top-directed approach uses conventional methods of data collection and processing. Bottom-directed monitoring may rely on other methods, such as participatory rural appraisal, process documentation, direct involvement of stakeholders in working group meetings and so on.
- Distinguish between those few indicators for which data must be collected from all sites versus those for which sampling may be sufficient. Data may need to be collected from all sites about key aspects of implementing tasks and reaching targets. Sampling from a small number of sites will probably be sufficient for indicators about immediate outcomes, impacts and field-based monitoring of issues arising during implementation.
- Meetings of the working group, policy coordination committee and other planning groups should include review of monitoring and evaluation information as a regular part of their meetings. Such reviews should sometimes result in identification of action items for follow up or discussions about how the programme may need to be modified. These meetings are also opportunities to identify requirements for information about specific issues.
- Evaluation is about outcomes, which tend to occur immediately or within a year or two, and impacts, which may occur several months or years after implementation.

Commonly-used outcome indicators are:

- Reduction or reassignment of irrigation scheme staff;
- Reduction in government expenditures for irrigation O&M and Cost of irrigation to farmers;
- Changes in irrigation scheme budgets, fees and fee collection rates;
- Changes in O&M plans and procedures;

- Functional condition of irrigation infrastructure.

The following are examples of commonly-used impact indicators:

- Irrigation service area;
- Water delivery performance;
- Irrigation efficiency;
- Cropping intensity;
- Agronomic productivity per unit of land and water;
- Economic productivity per unit of land and water;
- Farm income and employment;
- Extent of waterlogging and salinity

6.5 SESSION 5: FORMULATION OF SERVICE AGREEMENTS

Specific objective

To understand the importance of service agreements such as MOUs and their formulation

Session objectives

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

- Define MOUs and their importance
- Outline the components of service agreements
- Discuss the service agreement formulation process

Session flow

- MOUs and their importance
- Components of service agreements
- Service agreement formulation process

➤ Define MOUs and their importance

MOU is a transfer agreement between IWUA and the irrigation department in which the irrigation department agree to transfer to the IWUA responsibilities for operation and maintenance of certain parts of the irrigation system including the drainage system and the collection and remitting of water charges.

➤ The importance of MOU

Clearly defines roles of IWUA and Irrigation department improves service delivery and prevents conflicts.

➤ Outline the components of service agreements/MOU

- Irrigated area to be transferred

- Existing irrigation system
- A copy of map showing such areas
- The ownership of the land after transfer(whether the ownership will remain with irrigation department or IWUA
- Provision for transfer of any ancillary equipment
- Provision for joint management for interim period if agreed
- Inventory of all assets transferred
- Responsibilities of both Irrigation department and IWUA(responsibilities of IWUA is derived from their by-laws)
- Provision absolving the irrigation department from liability that may arise due to reasons of force majeure or act of God.
- Implementation time line and contract period
- Terms for termination
- **Discuss the service agreement formulation process**
- Analysis of performance gaps, changes required
- Analysis of stakeholder participation options and capacity;
- Identification of units and functions to be transferred;
- Identification of changes to be made in public agencies, policy and legislation;
- Drafting and signing of the agreement

Annex 1: Timetable

TIME	SESSION/TOPIC	RESPONSIBLE PERSON
DAY 1 9.00-9.15	Registration of participants	SCIS/PIU/SPIU
9.15-9.45	Climate setting Pre Evaluation	PIU/SPIU/SCIO
9.45-10.00	Opening of the Training	CEC Agriculture Siaya/Busia County

10.00-11.00	Introduction to Irrigation Management Transfer (IMT) <ul style="list-style-type: none"> - Define Participatory Irrigation Management and Irrigation Management Transfer. - Discuss the justification for IMT. - Outline elements of IMT. - Discuss experiences and challenges in IMT 	PIU/SCIO
11.00-11.30	TEA BREAK	
11.30-13.00	Current Irrigation Management Structure <ul style="list-style-type: none"> - Explain the Current Irrigation Management Structure. - Enumerate the roles, responsibilities & authority in the current management structure. 	PIU/SPIU/SCIO
13.00-14.00	LUNCH	
14.00-16.00	Current Irrigation Management Structure <ul style="list-style-type: none"> - Identify and discuss management GAPS in the current management setup. - Identify and discuss stakeholders in IMT 	PIU/SCIO/SPIU
DAY 2 9.00-9.30	RECAP	PIU /Trainers
9.30 – 11.30	IMT transfer processes and procedures. <ul style="list-style-type: none"> - Discuss the requirements for IMT (Policies, Legislation, and Capacity of the IWUA etc.) - Discuss IMT options including potential functions for transfer. <p>Discuss the IMT process and procedures.</p>	PIU/SPIU/TOTs/SCIO
11.30 12.00	TEA BREAK	

12.00- 13.30	IMT Agreements and Protocols <ul style="list-style-type: none"> - Discuss IMT Agreements and Protocol. - Explain the components of the IMT Agreements and Protocol. - Demonstrate ability to negotiate and participate in the IMT agreements and Protocol. - Discuss IMT timelines and M&E. 	
13.30 – 14.30	LUNCH BREAK	
14.30 – 15.30	Formulation of Action Plan	Participants PIU/SPIU Trainers
15.30 -16.00	Closing program	PIU/SPIU Trainers