

PARTICIPATORY ECOLOGICAL LAND USE MANAGEMENT (PELUM-KENYA)

SOIL AND WATER CONSERVATION FOR SUSTAINABLE LIVELIHOODS TRAINING REPORT



L-R: Front: Nthiga, Mwanzia, Mwalugha and Ndondoo
L-R Middle: Leah, Makokha, Simiyu, Njenga, Edwin, Sikunyi, Chichi and Munoru
L-R Behind: Maryleen, Lilian, Ngingo, Ngososei, Chemjor, Thairu, Angadia, Nyongesa and Jakinda

**For
Project Extension Officers
From
PELUM- Kenya Country Working Group
Held Between 17th and 19th July 2012
At
Shammah Hotel and Guest House, Masii Town**

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ACRONYMS

AGM	Annual General Meeting
ASAL	Arid and Semi Arid Land
BAC	Baraka Agricultural College
BIA	Bio-Intensive Agriculture
BERMA	Busia Environmental Resources Management
CAACs	Catchment Areas Advisory Committees
CAL	Campaign Advocacy and Lobbying
CBA	Cost Benefit Analysis
CBO	Community Based Organization
CDF	Constituency Development Fund
CEO	Chief Executive Officer
CEP	Capacity Enhancement Programme
CPC	Community Project Cycle
CWG	Country Working Group
DEAP	District Environment Action Plan
EIA	Environmental Impact Assessment
ELUM	Ecological Land Use Management
EMCA	Environment Management Coordination Act 1999
ERSWEC	Economic Recovery Strategy and Wealth Creation
FAAB	Farming As A Business
FCCs	Forest Conservation Committees
FLD	Farmer Led Documentation
GoK	Government of Kenya
Hhs	Households
H ₂ O	Hydrogen-Oxygen (Water)
ICE	Institute for Culture and Ecological
IGAs	Income Generating Activities
IWRM	Integrated Water Resource Management
INADES	African Institute of Social Economic Development
KEBS	Kenya Bureau of Standard
KEWI	Kenya Water Institute
KFS	Kenya Forest Services
KDC	Kitui Development Centre
MHAC	Manor House Agricultural Centre
MOs	Member Organizations

MOA	Ministry of Agriculture
MoWI	Ministry of Water and Irrigation
NALEP	National Agricultural and Livestock Extension Programme
NASARDEP	Nyanza Sustainable Agriculture and Rural Development Programme
NEMA	National Environment Management Authority
NIB	National Irrigation Board
NGO	Non Governmental Organization
NWRMS	National Water Resource Management Strategy
OVC	Orphan and Vulnerable Children
PELUM- Kenya	Participatory Ecological Land use Management
PENELI	Promoting Elum Networking for Livelihood Improvement
PMC	Project Management Committee
POM	Programme Operation Manager
PRSP	Poverty Reduction Strategy Paper
QCA	Quality Control Assurance
RBM	Results Based Manager
RODI-Kenya	Resources Oriented Development Initiatives
RIM	Research and Information Manager
SACDEP	Sustainable Agriculture Community Development Program
SHG	Self Help Group
SOs	Support Organizations
TGM	Triennial General Meeting
ToR	Terms of Reference
UCCS	Ukambani Christian Community Services
UN	United Nation
WAB	Water Appeal Board
WRM	Water Resource Management
WRMA	Water Resource Management Authority
WRUA	Water Resources User Associations
WSB	Water Service Board
WSP	Water Service Provider
YARD	Youth Action for Rural Development

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CHAPTER 1; BACKGROUND

1.1 PELUM Association

Participatory Ecological Land Use Management (PELUM) is a network of civil society organizations working with local communities in Eastern, Central and Southern Africa to improve their livelihoods. The Association was launched in 1995 and is currently present in 10 Africa countries namely: Kenya, Uganda, Rwanda, Tanzania, Zambia, Malawi, Zimbabwe, Lesotho, Botswana and South Africa.

1.2 PELUM-Kenya

PELUM-Kenya is part of the greater PELUM Association family. Currently it has 37 members including Nyanza Sustainable Agriculture and Rural Development Programme (NASARDEP) that was confirmed during 2012 Annual General Meeting (AGM). The Country Desk is hosted by Sustainable Agriculture Community Development Programme -Kenya (SACDEP) in Thika, about 40 Km North of Nairobi.

PELUM-Kenya has six structures namely;-

- Country Working Group (CWG) which has 37 members, small scale farmers being the epicentre.
- Country National Board which is the advisory body of the association at country level.
- The Country Desk where activities of the association are coordinated at the country level.
- Regional Desk which is based in Lusaka Zambia, where regional activities are coordinated.
- Regional Board that oversee the running of the association in the region.
- Triennial General Meeting (TGM) which is the supreme body of the association that holds its meeting after every three years.

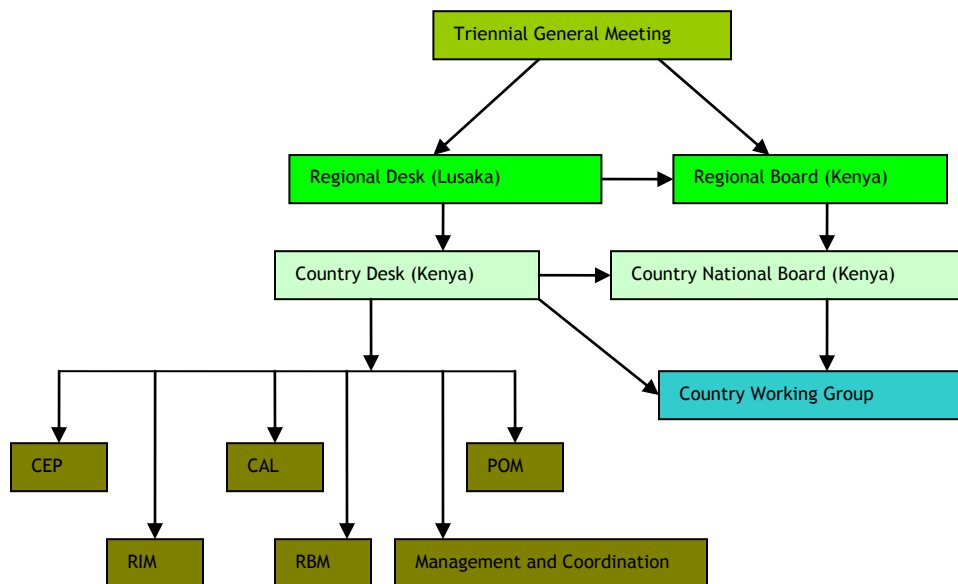


Figure 1; PELUM organogram

PELUM–Kenya is involved in various fields in favour of small scale farmers for example promoting participatory ecological land use and management practices, sharing of information on development, experiences, innovation and best practices, strengthening linkages and collaboration, lobbying for change and formulation of policies that promote seed security and indigenous food programme.

In future PELUM Kenya is planning to;

1) Strengthen sharing, learning and networking among;

- Farmers and farmers at all levels (self-help farmer groups, others farmers, etc).
- Member organizations to Member organizations (MO's)
- Country Desks in the East African sub-region.
- Country Desks in the Region.

The main focus will be emphasizing on what is working and the best practices

2) Strengthen the Country Desk, PELUM-Kenya MO's and community / farmer groups on:

- Governance and democratization.
- Self-organization, determination, driveness, empowerment and sustainability.
- Finance management and accountability.
- Organizational growth and development at all levels i.e. the Country Desk, PELUM-Kenya MOs and the community / farmer self-help groups.

3) Construct, set up and run a centre to promote ecological land use management (organic agriculture, permaculture, Bio- Intensive Agriculture (BIA) and biodynamic agriculture).

4) Make ecological agriculture work for small scale farmers.

1.3 Ukambani Christian Community Services (UCCS)

UCCS was established in 1987 as a department of ACK doing community development work. It was later registered in 2003 as a Limited Company by Guarantee. It covers Lower Eastern Province of Kenya. It works with Community Based Organizations (CBOs) with 4 key programmes namely:

1. Integrated food security
2. Water and Sanitation
3. Environmental Conservation and Climate change
4. Special programmes

1.4 Background to the Workshop

1.4.1 Workshop Dates and Venue

The Soil and Water Conservation training workshop was held for three days starting from 17th to 19th July 2012 at Shammah Hotel and Guest House in Masii Town. Participants reported on Monday 16th and left on Friday 20th July 2012.

1.4.2 Overall Aim, Purpose and Programme Background

The overall aim of the workshop was to enhance the knowledge and skills of field extension workers and agricultural trainers in soil and water conservation for sustainable agricultural production.

The purpose of the workshop was to emphasize the importance of soil and water conservation for enhancing sustainable livelihood.

PEUM Kenya is in the process of implementing the Promoting *Elum* and Networking for Livelihood Improvement (PENELI) Programme. This is a three years programme (2011-2013) with the main aim of increasing the application of ecological land use and management (*elum*) practices and networking to enhance sustainable Natural Resource Management (NRM). The concept of sustainability points into managing soil and water resources.

1.4.3 Specific Workshop Objectives

By the end of this workshop, PELUM Kenya expected participants to realize the following objectives:

1. To facilitate participants to learn and understand the various technical issues on soils and water.
2. To facilitate sharing of experiences among the participants.
3. To identify gaps in the implementation of skills and knowledge gained in the previous training.
4. To experience field practice on soil and water conservation.

The workshop facilitation was carried out in a participatory manner whereby it included various approaches namely; lecture notes, discussions, demonstrations and field examples. The workshop preparation required participant;

1. To speak with one person in their organization or community group regarding to this workshop.
2. Ask them what is their general overview and thoughts on this subject.
3. Print a picture of the person.
4. Capture their thought on paper next to the picture and carry this with you to the workshop.

The message was expected to be simple and precise. The outcome was shared and the outcome is provided as part of the workshop outcome in Chapter 4.1

1.5 Workshop Participants

The workshop was attended by 23 participants represented by 18 males and 5 females translating to 78% and 22% respectively (see gender representation in Fig 2). The workshop targeted mainly the project extension officers from PELUM MO's (See participants representation in Fig 3).

The facilitator, Mr. Stephen Ngososei was drawn from RISDEV. The workshop was moderated by Ms. Maryleen Micheni from PELUM Kenya. (*See list of facilitator and participants in annex 5*).

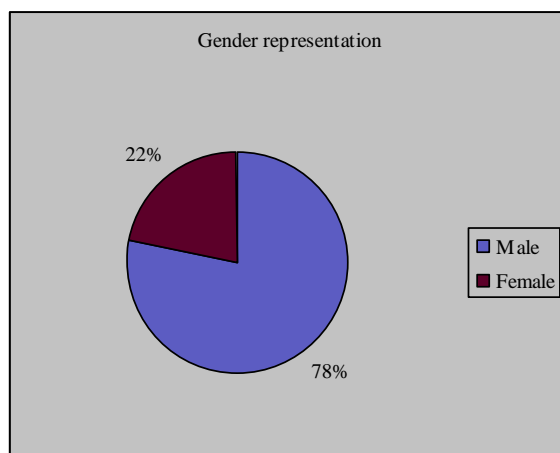


Figure 2: Gender representation

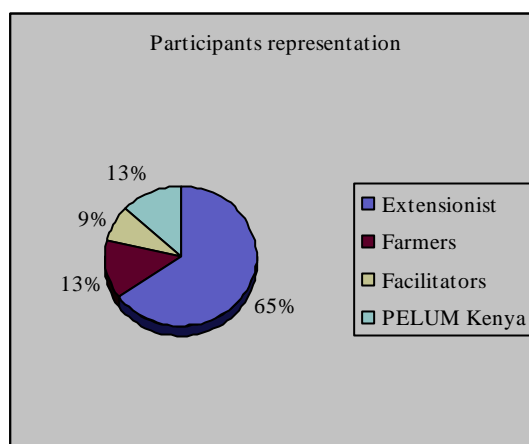


Figure 3: Participants representation

1.6 Introductions and Participants Expectation

The introductory session was carried out in pairs each identifying partners name, organization, position and one expectation from this workshop. Participants also came up with one challenge in soil and water conservation especially those who attended Soil and Water Conservation Training Part I which was held at Kitui Town.

The facilitator guided how to identify workshop expectations and challenges. Participants formed three groups and they identified expectations that were later clustered. The outcome of each group is provided in Table 1 below.

Table 1: Participants expectation and challenges

Groups	Participants expectation	Challenges
<u>Group 1</u> <ul style="list-style-type: none"> KICIP FAN RIDEP BERMA UCCS NIA 	<ul style="list-style-type: none"> Learn more on soil and water conservation. Share experience with others communities on soil and water conservation. Learn more on water harvesting techniques. 	<ul style="list-style-type: none"> So many needy people in communities with limited resources. Low understanding in linking trees and water.
<u>Group 2</u> <ul style="list-style-type: none"> ICE NECOFA BIOGI MHAC PELUM 	<ul style="list-style-type: none"> Collect information on soil and water conservation. Learn more on soil testing techniques. Explore soil and water technology/ techniques. Share experience. 	<ul style="list-style-type: none"> No presentation

<ul style="list-style-type: none"> • YARD 		
Group 3 <ul style="list-style-type: none"> • RODI • GBIACK • KOAN • ARDP • ALIN • PELUM 	<ul style="list-style-type: none"> • Learn appropriate ways and technologies of soil conservation. • Transformation from conventional to organic farming for sustainable livelihood. • Learn more on water harvesting structures. • Learn more on Water Act 2002. • Learn how people with lands prone to soil erosion can be controlled. • Exchange ideas pertaining to soil and water conservation techniques. 	<ul style="list-style-type: none"> • No presentation

1.7 Workshop Norms and Key Roles for Participants

The participants and facilitators agreed on some workshop norms and responsibilities that made the sessions focused and minimized cases of time wastage. The workshop norms and roles of various participants are attached in the annex 1.

1.8 Opening Remarks

The opening remarks were made by Ms. Esther Musili also the Chief Executive Officer (CEO), UCCS. She first welcomed participants who represented PELUM MO's. In her remarks; she just briefed participants on UCCS programmes namely:

- Integrated food security
- Water and Sanitation
- Environmental Conservation and Climate change
- Special programmes



She said that in early 90's the population in Arid and Semi Arid Lands (ASALs) started experiencing influx of people from highlands due to population pressure hence uneconomical land size. The current situation of experiencing environmental degradation is still rampant even if like minded organizations are still involved. This is due to resistant to change of attitude and lack of collaboration. Some of the solutions she identified included:

- Transformation of attitude that will be translated to practices.
- Engage practical strategies i.e. collaborating with like minded organizations and line Ministries.

Plate 1; Ms Esther Musili delivering opening remarks

- Embrace technologies and efficient water utilization methods of farming e.g. drip irrigation, green house management among others. She gave an example of Israel. They usually import soil from other countries that can support food production since their land cover is sandy soil.
- The organizations should support water related policies and other resources for better terms.

She declared the workshop officially opened at 9:45am.

CHAPTER 2: SOIL CONSERVATION TECHNIQUES AND FIELD EXERCISE

2.1 Background

The first day facilitation included soil composition, soil type, soil structure, principles of soil erosion



control and conservation techniques led by the facilitator Mr. Stephen Ngososei. The day ended up with group discussions and two video clips on *elum* practices and soil and water conservation techniques applied in Tigray, Ethiopia. The facilitator emphasized more on challenges in soil and water conservation, the root cause and solutions. This gave participants a clear background through experience sharing and the way forward.

Plate 2: Mr. Stephen Ngososei during presentation

2.2 Soil Conservation

2.2.1 Challenges, Root cause and Solution to Soil and Water Conservation

The facilitator guided participants on plenary discussion related to challenges, root causes and solution to soil and water conservation process.

1. Challenges

1. Lack and ignorance of understanding importance of soil and water conservation.
2. There is competition of crop wastes between fodder crops and soil conservation (line trash) after harvesting.
3. Some focus soil and water conservation as government project. For example in Western Kenya and Nyanza uprooting of striga weed was perceived as government project since it was done by force. Also in 1930-60's whites were forcing Africans to do terracing.
4. Ratio of farmers and extensionist is unbearable.
5. Lack of youth uptake in agricultural activities. They usually perceive it as punishment.

2. Root Cause

1. Technology
2. Priorities- agriculture is perceived as punishment
3. Perception from colonialism i.e. lack of transformation
4. Weakness in syllabus (lack of agricultural practices in schools)
5. Conflict of interest – e.g. use of manure for biogas production and organic manure.
6. Soil and water conservation projects are short term hence incapable to evaluate.
7. Lack of involving/ capturing community indigenous knowledge.
8. Practicing to please the donor hence no change at farmers level.
9. The policies are formulated 'up to down' policies.

3. Solution

1. Establish demonstration plots to motivate farmers
2. Attitudinal change
3. Change of syllabus in schools to adapt with current situation in agriculture.
4. Government involvement e.g. NALEP follow up and reporting.
5. What is on the ground and benchmarks should be fully community involvement.
6. Public participation and advocacy for better terms.
7. Team work
8. Use of focal persons to ensure consistency and concentration.
9. Change the training approaches e.g. exchange visits, idea and experience sharing, local knowledge and Farmer led Documentation (FLD).
10. Encourage youths in agricultural activities by offering them already prepared farms (terraced, trenched).
11. Enforcement laws to control farm layouts e.g. terracing.
12. Synergies i.e. societies to join together to contribute to success.
13. Lobby for at least 10% allocation of agricultural budget.
14. Promote and encourage Farming As A Business (FAAB).
15. PELUM Kenya to sensitize on agricultural policies both national and regional levels.
16. Practice intercropping to reduce crop waste competition between fodder and composting. BIA contributes to 60:30:10. 60% for carbon crops that contributes to biomass for composting, 30% for root crops that contribute calories and 10% for vegetables that contributes immediate income.

2.2.2 Soil Composition

Soil is loose material composed of weathered rock, minerals and organic matter that can be managed to support plant growth. Soil composition describes the various particles or substances in a sample of soil.

This includes:

1. Layer of undecayed plant/animal wastes.
2. Fine particles of clay
3. Black humus
4. Sand and fine gravel
5. Gravel and small stones.

2.2.3 Soil Components

Soil is a mixture of minerals and organic substances. Minerals are made from rocks, sand, clay, mineral salts and organic matter from plants and animals. Coarse and fine substances of different sizes i.e. gravel/ sand, clay soils particles. The components are soluble or insoluble in water i.e. granules, powder or organic in nature.

Table 2: Cross section of soil

XXXXXXXXXXXXXXXX	Top soil (8"-12")	Organic matter (animal matters, leaves, micro-organism, water, air and humus).
XXXXXXXXXXXXXXXX		
VVVVVVVVVVVVVVVV	Subsoil (up to 2ft)	Formed by small hard pan with accumulation

vvvvvvvvvvvvvvvvvv		of minerals. Fertile area of the soil and rocks.
TTTTTTTTTTTTTTTTTT	Bedrock (3-7 ft)	Retains water with less minerals

2.2.4 Soil structure

Soil structure describes the proportions of sand, gravel, silt, humus and lime. It describes the way in which soil materials are mixed together to form clods, blocks, aggregates and granules. Soil structure depends on:

1. Type of materials, the proportions in which they are mixed.
2. The way soil is worked by water, living organisms and tillage implements.

In sand soils, presence of organic matter and humus promotes water retention. Gravitational flow is slowed down because organic matter holds water. In clay soils, presence of organic matter is good for drainage because it creates water channels in the soil. On the other hand capillary rise decreases whenever the pores are blocked by organic matter.

2.3 Principles of Soil Erosion Control

The key considerations for controlling soil erosion are;

1. Topography- this is the gradient of the land. Different techniques will differ where gentle and steep ground.
2. Soil type- soil type will consider loam, sandy and clay soils may have different approaches.
3. Amount of runoff in a given area- Amount of runoff along drainage system or cut-off may differ due to velocity of the runoff.
4. Amount of rainfall pattern- conservation techniques in low and highlands. In highlands tendency of more rain is high hence permanent and stronger structures are required.
5. Land tenure- family land or leased land may hinder construction of permanent conservation techniques.

2.4 Soil Conservation Techniques

Some of the key soil conservation techniques are:

1. Strip cropping ensures crop cover which control runoff on land. The strip of crops or a line of crops stops water from flowing over the land. The strip could be made of grass or crops in line.
2. Catchment basin or catchment control- catchment basin of a river is the land lying on both sides of the waterway and source of water. Two catchment basins are separated by a watershed or ridge where water flows. These two basins need to have trees planted to cover the soils and reduce erosion.
3. Tilling or ploughing along contours helps to reduce the runoff across land. Planting grass strips or crops to separate field helps to reduce runoff on land.
4. Mulching protects soils from effects of splash, preserves soil porosity and infiltration.

5. Intercropping is an efficient way of quickly providing plant cover on tilled land.
6. Stone bunds or low stone barriers slow down runoff allowing infiltration and deposits of runoff load.
7. Earth bunds are earth banks which are designed to stop runoff. They are easy to build by heaping soils to form a bank. Plants are then grown on the banks to hold soils.
8. Terraces are plots on such slight, low or slope gradient which controls the slope of land. When a terrace is level and horizontal, all rain water infiltrates when it falls. Such terrace is called bench terrace.
9. Stone banks and walls are constructed on steep slopes to control runoff and retain soils and water flows over the bank when full. Gabions are made of wire and tacked with stones also control erosion in steep valley.

2.5 Video Show

Participants watched two video clips on best practices on soil and water conservation in Tigray, Ethiopia and best practices on *elum* documented by COSDEP in Kiambu County. The Tigray community has established structures include use of gabions, retention wall, and vegetation cover, check dams and paved furrows that reduced seepages. The success story was that; they have excess water for both domestic and irrigation use, recharge rate of the well is high and raised water table, community is now food secure and improved hygiene due to reliable water. The project sustainability is formulation of by-laws.

The second video was on *elum* practices. Participants learnt on mushroom production, livestock production and agro forestry. The workshop moderator highlighted that PELUM Kenya documents good practices within its MO's.

Questions and Issues that emerged

Questions

Q; What causes hard pan?

A; *Compaction of the soil.*

Use of traditional tools e.g. pangas for several seasons.

Erosion of loosened soils during tillage.

Q; Can clay soil support bean production?

A; *The roots cannot penetrate plastic soils since the roots are soft hence tendency of retarding is high. Also water logging cannot allow ripening of the beans.*

Emerging Issues

- A case study in highland indicated that, pineapples and beans were introduced and later the project failed due to lack of analyzing the soil types.

- Some of the soil and water conservation challenges that emerged were;
 - Public roads drainage utility contributes very much to erosion.
 - There is low uptake to those upstream and in highlands.
 - The activity is perceived as labour intensive.
 - Lands are sub-divided to uneconomical returns.
 - Boundary disputes.
 - Inequality distribution of resources.
 - Prioritization of community needs.
 - There are leaders with self seeking interest.
- Some of the solutions to above challenges are:
 - Use of simple tools e.g. 'A' Frame.
 - Use of stone lines in ASAL areas while stovers are used for trash lines, ditches and check dams along areas prone to erosion.
 - Transformation of those who resist to change.

Group Work and Presentations

1. Form three groups of six people each.
2. Identify chairperson and reporter.
3. Identify the following for readiness for discussion.

Group 1: Key successes and innovations.

Group 2: Opportunities that can be identified.

Group 3: Gaps/challenges and how they can be addressed.

Presentations were carried out on day 3 and presented as a workshop outcome. See chapter 4.2





Plate 3: Participants during group work

DAY 2

2.6 Field Trip

The second day was meant for a field day in 5 distinct project areas. The participants visited a CBO that collaborates with UCCS. The excursion started with visiting UCCS offices then to Kalawani Chief's camp where preliminary meeting was held. The Kalawani CBO committee members joined PELUM Kenya team and visited five sites namely Kinywani Vision Youth Group, Kwa Mbuku, Kwa Muua, Mumbuni and Kwa Mutangi. The team visited soil and water conservation projects and their secondary related activities. During sites visit, participants were assigned to point out some key areas that formed the outcome of the field trip. The outcome is provided in Chapter 4.2.

2.7 Background of Kalawani Progressive CBO

Kalawani progressive CBO is a Non Government Organization (NGO) comprising of 13 Self Help Groups (SHGs) with a total of 304 members translating to 229 females and 75 males. The vision is to reduce poverty, provide adequate and potable water for domestic purposes while mission is to empower the groups to achieve a sustainable livelihood. The activities undertaken by the CBO are listed and tabulated here below.

1. Water

Currently there are 6 operational sand dams assisting 752 households. These dams are:

Dam	Along River	Beneficiaries (Hhs)
1. Kwa Muua	Ngwani	152
2. Kwa Mutaki	Kikumu	128
3. Kwa Mwatu	Kituku	145
4. Kwa Kyonse	Kikumu	96
5. Kwa Mbuku	Ngwani	105
6. Kwa Musau	Kituku	126

2. Agriculture

Seven groups have been supported with drip irrigation facilities. The groups have introduced demo plots and “*tumbukiza*” farming technologies. These groups are:

Group	Farming method
1. Wendano wa Kamusongo SHG	<ul style="list-style-type: none">• Drip irrigation• <i>Tumbukiza</i>• Demo plot
2. Kinyuani Vision Group	<ul style="list-style-type: none">• Drip irrigation
3. Kalungu Youth Group-	<ul style="list-style-type: none">• Drip irrigation• <i>Tumbukiza</i>

4. Wikwatyo wa aka ma kithetheni SHG	<ul style="list-style-type: none"> • Drip irrigation
5. Kyone Women Group	<ul style="list-style-type: none"> • Drip irrigation
6. Kinyuani/Kituku SHG-demo	<ul style="list-style-type: none"> • Drip irrigation • Demo plot
7. Kyeni kya Kituku SHG-demo	<ul style="list-style-type: none"> • Drip irrigation • Demo plot

NB; Three groups are on demo farming technology.

3. Livestock production

Six groups were trained on poultry keeping. These groups are:

- Kalawani Youth Group
- Wendano wa Kithetheni Women Group
- Kayamba SHG
- Kinyuani /Kituku SHG
- Kinyuani Vision Youth Group
- Tusalukye SHG

A total of 14 paravets have been trained and equipped with necessary materials. The group has been issues with 20 Germany Alpine consisting of 11 does and 9 bucks for improving local breeds hence increasing milk production.

4. Aquaculture

Three groups have been supported with fish ponds. These groups are:

- Kamusongo SHG
- Mumbuni SHG
- Kinyuani Vision Youth Group

5. Soil and water conservation projects

The project has trained 31 members including 17 men and 14 women. 4,500 meters has been done terracing and 19,000 trees planted. Out of these trees, 14,000 trees survived translating to 76% which was rated as significant. Some members have been trained in greenhouse management.

6. Relief food programme

In 2011, about 455 Hhs benefitted from food aid programme. 500 farmers were supported with cowpeas and green gram seeds while 12 farmers were trained on horticultural farming.

The Orphans and Vulnerable Children (OVC's) through UCCS were supported with 40 goats. Out of this 19 goats have already kidded and more orphans are expected to be supported soon.

The general project impacts

The projects have generally impacted positively on the following areas:

- Almost 1,000 Hhs and their livestock have benefitted from the sand dams.
- Reduced long distance looking for water hence saved time for other productive home chores.
- Small irrigation farming projects along the river banks were introduced.
- Creation of Income Generating Activities (IGAs).
- Increased food production within the area hence food secure.
- Reduced human diseases.
- Improved environment.

Challenges

Some of the key challenges are:-

- High rate of soil erosion.
- Inadequate knowledge.
- High rate of HIV/AIDS.
- Low livestock production due to poor and low yield breeds.
- Food insecurity.
- High rate of deforestation.

Participants at Kalawani Chief's Camp



Mr. Evans Mwanzia briefing PELUM Members about the Kalawani CBO



Ms. Maryleen Micheni introducing representatives of PELUM Kenya MOs



The Committee of Kalawani CBO



Ms. Agnes Mweni, the Area Chief of Kalawani Location

Human Stories from Kalawani CBO Beneficiaries

The team managed to visit 5 sites whereby the information shared included;

- A brief history of the community group
- The processes involved in (in terms of funding, contribution, community involvement and commitment).
- Success stories
- Challenges
- Future plans.

Site 1: Kinyuani Vision Group

Mr. Mwangangi Njoka



*.....in this farm we have an earth dam that provides water for pumping to storage tanks for drip irrigation. Other facilities within the farm are greenhouse and demonstration site for water harvesting structures such as negarims, zai pits and fish scale pit.....
.....we also demonstrate on double digging and sunken beds that are recommended in ASAL areas.....
...our future plans are improving local goats with Germany Alpine and chicken rearing whereby poultry house is already established through the support of UCCS.....*



Participants during demonstration at demo plots



An earth dam and further across the reservoir is a greenhouse including demo plots



A poultry house designed for 80 birds



An example of a sunken bed that is recommended in ASAL

Site 2 Mr. Dickson Mbiti



*.....before the project, we used to walk for a distance of 5kms seeking for water using hand held buckets.....
some of the realized benefits include socio-economic, health and nutrition benefits. The groups have also started IGA for livelihood improvement while future plans are to buy water pumps and do Farming As A Business.....*



The sand dam along Gwani River



View of vertical or multistorey gardening that is highly recommended for maximum land utilization



Mr. Peter Kilonzo
(Secretary) briefing visitors
on their progress



The representatives included women and youth
group

Site 3: Kwa Muua (Cheeni Cha Kituku SHG)



A success story for Cheni cha Kituku SHG



View of a drip irrigation system



Bird view of the sand dam where they abstract water using water pump

Site 4: Kwa Mutaki Dam



Mr. Evans Mwanzia from UCCS leading participants through the demo plots near the sand dam



View of a reservoir that will eventually be covered with sand hence less evaporation



The demo plot next to the dam that shows the success

NB: There were no representatives at the site

Site 5: Mumbuni Tree Nursery (Mumbuni Water Project)



Far view is the intake site for Mumbuni water project



View of a fish pond ready for introducing fingerlings



View of tree seedlings nursery beds



One of the community members briefing visitors on group history

The day ended up with closing remarks from community members, Area Chief of Kalawani and one participant. The representatives made some recommendations and the outcome was as follows.

1. They should involve youths in projects.
2. The tree nursery project should consider more species for diversity considering ecological zone.
3. They were encouraged to share the success stories and challenges with other communities so that they can learn from each other. This can be done through exchange and exposure visits.
4. The collaboration with Provincial Administration, Ministry of Agriculture (MoA) was remarkable. However, there is need for more collaboration to all line Ministries.



Community Member



Kalawani Area Chief



Miss Chichi from BIOGI

CHAPTER 3: WATER CONSERVATION AND GOVERNANCE PROGRAMME

3.1 Background

The third day started with a recap session of day 1 and presentations for day 2 on outcome from field visit. The outcome from the presentations is provided as an outcome of the workshop in Chapter 4.2. The facilitator led participants through water properties, cycle, sources, discharge and Water Act 2002 and EMCA 1999. Other presentations included water quality, standards and water conservation techniques. The workshop ended up with workshop evaluation and closing remarks delivered by Mrs. Mary Kyengo (Shammah Hotel Proprietor).

3.2 Water Properties

Water consists of chemical and physical properties. Chemical properties include hydrogen and oxygen atoms. Physical properties include its form in terms of vapour, liquid and solid.

Pure water is an odourless and tasteless liquid. It has a bluish tint, which may only be detected in layers of considerable depth.

3.3 Water Cycle

Water Cycle is a series of movements of water above, on and below the surface of the earth. It consist of four distinct stages namely storage, evaporation, precipitation and runoff. Water may be stored temporarily in the ground, oceans, lakes, rivers, ice caps and glaciers. It evaporates from the earth's surface, condenses in clouds, falls back to the earth as precipitation (rain or snow) and eventually either runs into the seas or re-evaporates into the atmosphere. Almost all the water on the earth has passed through the water cycle countless times.

3.4 Water Sources

Water sources include:-

1. Surface –rain water, surface runoff, dams and lakes.
2. Ground water- filters down the various layers of soil aquifers, wells and boreholes.
3. Biomass – water in plants and animals, lime juice, palm wine and blood.
4. Aerial water- water vapor in the air, clouds, mist, fog, hail and rain.

3.5 Water Discharge

Water flows in and out of aquifers as part of the water cycle. The flow of water into aquifers is called recharge and the flow of water out of aquifers is called discharge. The places where recharge occurs are called recharge areas. Discharge occurs wherever the ground dips down to the level of the water table. For example, springs occur in valleys where the valley sides meet the water table. If an enclosed depression in the earth dips below the water table, water can flow out of the saturated zone and into the depression, forming a lake or pond.

When recharge is equal to discharge, the water table is stationary. Heavy rainfall or spring melt can cause recharge to temporarily exceed discharge and the water table will rise. A rising water table may produce temporary springs, streams and ponds. These temporary discharge areas then drain water from the aquifer and lead to a restoration of the original level of the water table.

If a well is dug down below the level of the water table, it will start to fill with water. As water is removed from the well, the water table surrounding the well will drop, forming a cone-shaped depression in the water table. The depth and steepness of the cone of depression depend on how fast the water is being withdrawn, how porous and permeable the aquifer is and how fast the aquifer is being recharged. If the water table drops below the bottom of a well, the well will run dry. Many of the major aquifers throughout the world are being drained faster than they recharge. If this trend continues, many wells will run dry.

3.6 Water Governance Programme

The facilitator led participants through water governance programme that entailed principles and objectives of Water Resource Management (WRM). Other presentation included Community Project Cycle (CPC) and Water Sector Institutions (WSI).

3.6.1 Priority for WRM

The challenges that curbs high population in management of available water resources are:-

- The available water per annum is 647m³ which is insufficient.
- There is insufficient number of water resources infrastructure (13-19%).
- There is climate variability leading to spatial and temporal rainfall amount.
- There is catchment degradation leading to increased runoff, flash floods, erosion and siltation.
- Poor assessment and monitoring systems (water gaps).
- Shared transboundary water towers.
- Degradation of water resources leading to low quantity and poor quality.
- Influx of HIV/AIDS is a pandemic to development.

3.6.2 Water Sectors

The responsible water sectors to meet the above challenges are:

1. Water Service Trust Fund (WSTF) involved in financing water and sanitation facilities to disadvantaged groups.
2. Ministry of Water and Irrigation (MWI) is involved in:-
 - Development of legislation
 - Policy formulation
 - Sector coordination

- Technical advice
 - Monitoring and evaluation
3. Water Appeal Board (WAB) - involved in arbitration of water related disputes and conflicts.
 4. Water Service Regulatory Board (WSRB) involved in:
 - Regulation and monitoring of Water Service Board (WSB).
 - Issuance of licenses to WSBs.
 - Setting standards for provision of water services.
 - Developing guidelines for water tariffs.
 5. Water Service Providers - involved in provision of water and sewerage services.
 6. Catchment Area Advisory Committees (CAACs)- involved in advising WRMA on water resources issues at catchment level.
 7. Water Service Boards involved in:
 - Provision of efficient and economical water services
 - Developing water facilities.
 - Applying regulations on water services and tariffs.
 - Procuring and leasing water and sewerage facilities.
 - Contracting Water Service Providers (WSP).
 8. Water Resource Management Authority (WRMA) involve in:
 - Planning, management, protection and conservation of water resources.
 - Planning, allocation, apportionment assessment and monitoring of water resources.
 - Issuance of water permits.
 - Water rights and enforcement of permit conditions.
 - Regulation of conservation and abstraction structures.
 - Catchment and water quality management.
 - Regulation and control of water use.
 - Coordination of the IWRM plan.
 9. Water Resources Users Associations (WRUA) involved in:
 - Decision making process to identify and register water users.
 - Collaboration in water allocation and catchment management.
 - Assisting in water monitoring and information gathering.
 - Conflict resolution and cooperative management of water resources.
 10. National Water Conservation and Pipeline Corporation involved in construction of dams and boreholes.

11. Kenya Water Institute (KEWI)- involved in training and research.
12. National Irrigation Board (NIB)- involved in developing irrigation infrastructure.

3.6.3 Water Sector Reform

The Water Sector Reforms has been implemented to address the issues affecting the water sector. The Government of Kenya (GoK) initiated policy documents relevant to the water sector reforms. These include:

- Poverty Reduction Strategy Paper (PRSP).
- Economic Strategy for Wealth and Employment Creation (ERSWEC).
- National Water Policy.
- Water Act 2002.

1. The National Water Resource Management Strategy (NWRMS)

The fundamental objectives for managing Kenya's water resources are enshrined in the Water Act 2002. In sections 11(1) and (2) defines the NWRMS for managing, protecting, using, developing, conserving and controlling the country's water resources.

It prescribes the principles, objectives, procedures and institutional arrangements for the conservation and control of water resources including classifying water resources, determining the requirements of the reserve water, identifying areas designated as protected and conservation areas.

2. Integrated Water Resource Management (IWRM)

IWRM is a participatory planning and implementation process based on sound science that brings stakeholders together to determine how to meet society's long term needs for water resources while maintaining essential ecological services and economic benefits.

The principles of IWRM are:

- Sector wide approach to planning.
- Recognition of water as social and economic good.
- The human right to water.
- Equitable access to water.
- Stakeholders' participation.
- Gender considerations in water resources management.
- Capacity building.
- Financing of infrastructure should be ensured.
- Full cost recovery complemented by subsidies.
- Dissemination of information.
- Creation of an enabling environment.

- Adoption of best practices and technologies.
- User pays and polluter pays principles.
- Catchment approach to WRM.

Goals and Objectives of IWRM (NWRMS)

The key goals and objectives of IWRM are:

1. Creates mechanisms for integrated approach to land and water resources management on catchment basis.
 - i) Integrated catchment planning considering social, economic and ecological issues.
 - ii) Regulating and controlling legislative measures.
 - iii) Pollution prevention approaches by reducing, reusing and recycling through the following principles:
 - Precautionary principle
 - Remediation strategies
 - Polluter pays principle
 - iv) Recovery and restoration of degraded catchments through:
 - Identifying, delineating and gazettement the catchments.
 - Restoring e.g. afforestation, soil conservation.
 - Controlling of invasive species.
2. Measures to enhance availability of water suitable quality and quantity through:
 - i) Market based approaches e.g. water pricing, effluent charges and incentives for private sector participation.
 - ii) Technology based approaches through reduction of UFW, recycling wastewater, conjunctive use of water and efficient irrigation practices.
 - iii) Mandatory strategies such as prohibition of carwash at watering points.
 - iv) Public awareness to enhance user cooperation.
 - v) Construction of storage infrastructure e.g. dams, pans among other.
3. Promote equitable access to water through:
 - i) Legal and institutional provision that will ensure efficiency and effectiveness.
 - ii) Water allocation through considering all water users, water sufficiency considering prioritization, re-allocation and rationing. Also water use of strategic importance e.g. hydropower, strategic industries among others.
4. Enhance the role of gender through:

- i) Gender mainstreaming through integration i.e. widening gender concerns across many sectors and agenda setting i.e. transforming existing development agenda with a gender perspective.
- ii) Engaging key approaches of gender mainstreaming through:
 - Ensuring involvement of both men and women in all aspects of programmes and policies at all levels.
 - Incorporating gender concerns into the planning process.
 - Capacity building to equip women with skills to effectively participate in planning and management of water resources.

5. Improving water resources assessment through classification of water resources to inventorize all water sources, assign management classes, inventorize water use(r)s in terms of quantities, quality and purpose. Also to specify measurable parameters required for each class of water and determine reserve water both for domestic and ecosystem needs.

6. Promote production of accurate water use and demand data that will aid in decision making. Currently inadequate quality and quantity is due to limited financial and human resources. WRMA to take the lead in data acquisition, monitoring and sharing and catchment level information to be available at national level.

7. Provide guidelines for financing of water sector. The Water sector has suffered from inadequate funding in the past due to over reliance on the exchequer. Therefore, there is need for financing system to support Water Resource Management activities i.e. licensing fees, levies and water charges. Other sources of finances include GoK budget, commercialization of water utilities, money market financing e.g. micro financing (but not common) and external funding e.g. WSTF, WRUAs also to benefits.

8. Develop water pricing policies and mechanisms that recognize water as an economic good that promotes efficient utilization of water, incorporates the user pays principle. The pricing systems include average cost pricing (national, catchment and site specific pricing), targeted subsidies to cater for vulnerable groups and levies and fees.

9. Develop policies and mechanisms for disaster management to strengthen facilities, information, manpower and funding.

10. Promote harmonization and integration of transboundary waters.

Kenya has shared waters with Uganda, Tanzania, Ethiopia and Somalia. The strategies for shared international waters include:

- i) Improving collaborative WRM by incorporating interests of transnational stakeholders.
- ii) Establishing national institutional framework to address international waters.

- iii) Integrating relevant international conventions and treaties governing the management and administration of international waters into national legislation and policy.

3.7 Community Cycle Project (CPC)

3.7.1 Introduction

CPC is an approach developed to support improved access to water and sanitation in poor areas. Enhance capacity for communities to apply for, manage, implement and maintain their own water and sanitation facilities. Support services outsourced to private sector namely Quality Control Assurance (QCA) and Support Organizations (SOs). It promotes delineation of roles for improved control and good governance.

The CPC process has the following principles:

1. Ensures transparent selection of beneficiary communities based on need.
2. Encourages broad participation by men, women, marginalized among others.
3. Promote self-reliance and poverty alleviation.
4. Support community capacity development in Operation and Maintenance of water and sanitation facilities.
5. Delineates roles and responsibilities of stakeholders both public and private.
6. The cycle is demand driven.

3.7.2 Overview of CPC

The CPC has 6 phases namely pre-application, application, preparation, design, implementation and post- implementation. The table below summarizes the phases and activities involved in each phase.

Table 3: CPC Phases

Phase	Activity
Pre-application	<ul style="list-style-type: none"> • Selection of target locations
Application	<ul style="list-style-type: none"> • Awareness creation by WSB or its agent • Application by CBO for support to the WSB • Signing of contract between SO and WSB
Preparation	<ul style="list-style-type: none"> • Preparation meeting between WSB, CBO and SO • Resource mapping, layout and other plans • Baseline status for water and sanitation services • Training of community and committee members • Registration of CBO as WSP started • General meeting approves conceptual layout and planned activities • Roles and responsibilities of actors clarified
Design	<ul style="list-style-type: none"> • Detailed field survey

	<ul style="list-style-type: none"> • Design of structures, bills of quantities and costing of works • Financial proposal prepared • Proposal approved by CBO and community in general meeting • Financial proposal forwarded by WSB to WSTF
Implementation	<ul style="list-style-type: none"> • Detailed field survey • Design of structures, bills of quantities and costing • Financial proposal prepared • Proposal approved by CBO and community in general meeting • Final proposal forwarded by WSB to WSTF
Post –implementation	<ul style="list-style-type: none"> • End of defects liability period (where applicable) • Long term monitoring to measure sustainability of improved water and sanitation levels (WSTF, WSB)

The eligibility criteria for CBO to be funded must be from a target location, registered, willing to own and manage the water and sanitation facilities and willing to contribute to the cost of implementation.

Table 4: Roles of CPC Stakeholders

Stakeholder	Roles
WSB	<ul style="list-style-type: none"> • Ensure targeting of water and sanitation facilities. • Awareness creation. • Support establishment of CBOs. • Promote application for funding. • Hire and monitor QCAs and SOs
CBO	<ul style="list-style-type: none"> • Apply to the WSB for funding • Management of project implementation • Encourage community participation in the project process • Ensure interests of marginalized and vulnerable groups are incorporated • Manage and ensure best practices in funds utilization • Collect and manage community contribution
QCAs	<ul style="list-style-type: none"> • Act on behalf of the WSB • Undertake desk screening and field verification • Develop ToRs for SOs • Support the WSB in compliance and performance monitoring • Certify the quality of project proposals • Monitor construction quality
SO	<ul style="list-style-type: none"> • Support the community in fulfilling its roles and responsibilities • Develop capacity of CBO and community

	<ul style="list-style-type: none"> • Assist community in proposal writing • Empower community to implement, manage and sustain their own water and sanitation facilities. • Support CBO to register as a WUA • Ensure transparency and accountability in the use of funds
WSFT	<ul style="list-style-type: none"> • Ensure selection criteria are clearly and transparently applied • Review of proposals • Contract the CBO/SO during the implementation phase. • Fund the water and sanitation projects • Ensure the funds are properly utilized • Ensure all projects are audited

3.8 The Role of Local Authorities in NRM Legislation in Kenya

3.8.1 EMCA 1999

The following are some of the roles played by the Local Authorities under EMCA 1999:-

- Facilitate and ensure the enjoyment of a clean and healthy environment by every person within their areas of jurisdiction. These include the right by a person to access various public facilities for purposes of recreational, health, educational and spiritual or cultural.
- They perform statutory duties as lead agency, failure to which they will be held liable. National Environment Management Authority (NEMA) may also from time to time delegate duties to local authorities to discharge specific activities.
- Support its residents to access trust funds either as a project or award for exemplary management of the environment or access restoration fund for the purpose of restoration of degraded environment.
- Ensure proper management of environment within districts and province including development of District Environment Action Plan (DEAP).
- Protect wetlands within the area of jurisdiction. This includes regulating sand harvesting.
- Identify hilly and mountainous areas which are at risk of being degraded.

3.8.1 Water Act 2002

The following are some of the roles played by the Local Authorities under Water Act 2002 include:

- They obligated to develop and implement a catchment management strategy for the areas which can be declared as catchment areas.
- They can mobilize residents within their area of jurisdiction to form WRUA as provided under section 15 for purpose of

- Equitable distribution of water resources
- Conflict management
- Management of community/state schemes.
- Any drainage of a wetland within the jurisdiction of a local authority shall require a permit issued by the WSB. The same applies to discharge of effluent into a water body under the management of a local authority.

3.8.3 The Forest Act 2005

The following are some of the roles played by the local authorities under the Forest Act 2005 include:

- Develop and implement management plans or may adopt management plans drawn by other people or organizations in relation to the recommendations by the Kenya Forest Services (KFS).
- Developing modalities and guidelines for joint management of forests between the KFS, Local Authorities, communities, government agencies and private sector.
- Draw money for support of forest activities from the Forest Management Conservation Fund.
- Being the members of the Forest Conservation Committees (FCCs), they can initiate any land under their jurisdiction to be declared a catchment area of biodiversity hot spot on an area of cultural or scientific significance which supports an industry or is a major source of livelihoods for the local communities.
- Any local authority forest which is not properly managed shall be declared a provisional forest and its management shall vest in the KFS.
- The boundaries of any local authority forest shall not be varied and cessation of the forest may not be undertaken unless or until there is a recommendation from the service through a resolution by Parliament and an Environmental Impact Assessment (EIA) carried out.
- Part of the Local Authority forest may be exchanged with the private land where the exchange will enhance efficient management and protection of the forest among other conditions including EIA study.

3.9 Water Quality, Standards and Harvesting Techniques

3.9.1 Water Quality and Standards

Water quality is determined by the availability of nutrients required for potable water. The required qualities are characterized by its storage, supply, use, source, packaging and technology (supply, treatment and use).

Water standard is measure of certain qualities and quantities met to ensure safe use especially for domestic consumption. For example, Kenya Bureau of Standard (KEBS) inspects hygiene standards, cleanliness of source and methods of delivery or supply.

3.9.2 Water Harvesting Techniques

The key water harvesting sources include surface runoff, rivers, ground water and aerial water. The table below summarizes the water sources and harvesting techniques.

Table 5: Water sources and harvesting techniques

Water source	Harvesting techniques
Surface runoff	Ponds, water pans, negarims, retention ditches, terraces, check dams, sunken pits, underground water tanks
Rivers	Sand and earth dams
Ground water	Shallow wells, boreholes, springs protection
Aerial water	Roof, rock, tree catchments

Questions

Q; What are the categories of minerals that render water unsafe for consumption?

A; *Water with a lot of salt, fluoride and heavy metals.*

Q; Is construction of sand dams in ASAL an innovation?

A; *Yes, it's a new concept since they have been using earth dams. The innovation is covering available water with sand hence reducing evaporation rate.*

Issues that emerged

- The community should concentrate on the best approach and be replicated in all communities suffering from water problems.
- The community should be transformed so that they can have full ownership of the project. This is through community participation.

CHAPTER 4: WORKSHOP OUTCOME AND EVALUATION

4.1 Community Wall

From the information flyer, participants were urged to discuss one key issue related to soil and water conservation at organizational level. Participants posted their inputs at parking bay that were later revisited before workshop closure. The presentations were as provided here below.

1. NASARDEP-CEO

.....soil and water are the necessities required in attaining the livelihood goals. It is the duty of every citizen to conserve soil and water



2. RIDEP – James Murimi

.....I have seen the benefit of soil and water conservation after I started working in preparation of site pits and terraces supported by work food programme under “food for work” programme.....

..... I gave my land to be used as demonstration plot which I have been able to harvest maize, tomatoes, and kales that I believe they could not produce in my farm before, James said.

3. BERMA- CEO

This farmer acquired his land in 1985. When I visited him five years later he could not harvest anything.



We invited his group for training on organic farming which included agro-farming. It was facilitated by the MoA and other line Ministries. He also attended a workshop facilitated later by BERMA through PELUM on water and soil conservation. Now the farmer is proud of his fertile land and free from chemical fertilizer.

4. ALIN- Mr Kelvin Koinet



.....we need to protect our water towers/catchment areas and wetlands since they are the major sources of water. Protecting our forests areas too helps reduce soil erosion and runoff.....
.....sustainable farming practices help conserve both soil and water. Water harvesting can also be a good way of water conservation in dry regions.....

5. ICE – Martin Muriuki

I managed to speak with the ICE director, Mr. Martin Muriuki and he requested me to collect all the necessary information from the workshop because we need to train the community on how to conserve water and soil as a food security intervention. He said that it's of imperative importance that we conserve soil and water within our project areas and the Nation as a whole for sustainable agriculture production.

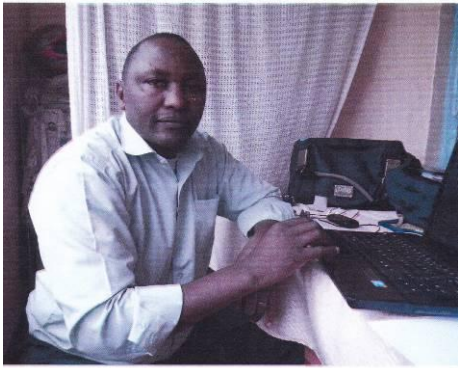


6. PELUM Kenya – Jeff Kahuho

Soil and water conservation forms the basis of our livelihood and can never be over emphasized. In the year 2010 we visited Israel, Negev desert and it is amazing to see how this desert has been converted into a green belt; and a food basket not only for Israel but also for export. Water is purified from salty Mediterranean Sea and used for farming. The soil is living and it is important to feed it with nutrients from compost.



7. BIDII- Edward Muriuki-Programme Manager



In think the workshop is as important as it aims to build the capacity of the Extension workers who are both in touch with knowledge / skill users.

It is worthwhile to note that water and soil are two major components in agricultural productivity thereby conserving our environment and reducing environment and reducing poverty among the farming communities.

8. MHAC- Joshua Ouko

Soil and water resources are diminishing yet they are the cornerstones of livelihoods. We need to scale up suitable conservation approaches to enhance sustainable livelihoods.



9. ARDP-CDN- Stanley Bii



The subject is vital because it conserves the soil and enhances water retention of the soils hence improving food production and household income.

4.2 Workshop Outcome after Field Visit

Table 6: Presentations after field visit

Groups	Success	Innovations
Group 1	<ol style="list-style-type: none"> 1. Good UCCS offices. 2. Willingness of communities in development. 3. Good collaboration with local administration and line Ministries. 4. Availability of water to the needy community. 5. Improved income to the beneficiaries from sales of farm produce. 6. Community capacity building by UCCS and line Ministries in strengthening the production capacity. 7. Increased food production. 8. Good relation between UCCS and funding partners. 9. Market linkages. 	<ol style="list-style-type: none"> 1. Construction of sand dams. 2. Farm water harvesting like zai pits, negarims and semi-circular hoops. 3. Use of silt traps in the water reservoirs. 4. Use of charcoal dust as potting media in the nursery. 5. Use of old containers to establish tree nursery.
Group 2	Opportunities that can be identified <ol style="list-style-type: none"> 1. Collaboration with other line Ministries and other development partners. 2. Diverse water catchment areas. 3. There is human resource. 4. They can benefit a lot from field visits. 5. There is ready market for the produce. 6. There are water pumps. 7. The groups are gender sensitive. 8. Drip irrigation technology that is water efficient. 9. There are water ponds for the collection of water runoff. 10. There are sand dams. 11. There are farm inputs suppliers within the area. 	
Group 3	Gaps /Challenges <ol style="list-style-type: none"> 1. Inadequate knowledge on pest and diseases control and management. 2. Post harvest management of pepper. 3. Involvement of men and youth is poor in 	How they can be Addressed <ol style="list-style-type: none"> 1. More training and exposure on pest and disease control and management. 2. Training on post harvest management. 3. More training on gender mainstreaming in

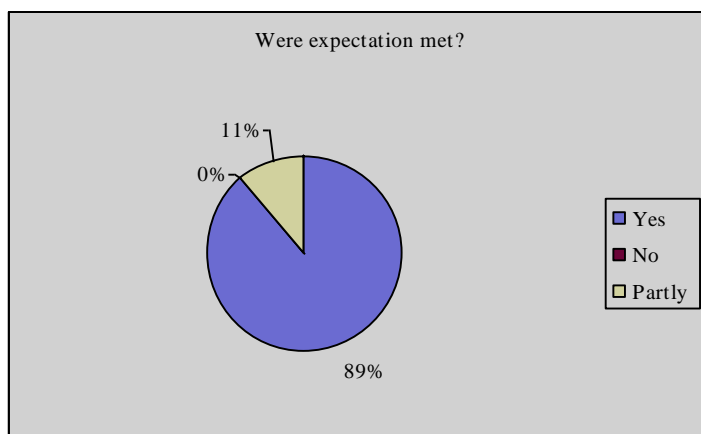
	<p>groups compared to CBO level.</p> <ol style="list-style-type: none"> 4. Inadequate funds to meet all the needs for the needy communities. 5. Poor implementation of some agronomic practices e.g. spacing, mulching, nursery management, and watering. 6. Poor prioritization on community needs especially on the green house. 7. Dependency level is very high on the groups e.g. fish pond. 8. Promotion of one tree specie in the tree nursery. 9. Soil and water conservation measures were only visible on the farm but not on other public utilities. 10. No clear exit strategy of the project in case of anything. 11. Lack of spill off or multiplier effect in the neighbouring farms. 12. Community contribution in the project was not clear. 13. Working with a name of pleasing the donors. 14. Unreliable rainfall in the area. 15. Poor governance and distribution of resources among the line Ministries e.g. CDF, water, irrigation among others 16. Long leadership chain i.e. CBO, PMC groups. 17. No clear objectives on the poultry project. 	<p>development.</p> <ol style="list-style-type: none"> 4. Mobilization of funds from all stakeholders 5. More training and frequent follow ups on good agronomic practices. 6. Carry out community need assessment. 7. Sensitize on ownership of the project for self reliance. 8. Introduce other local and indigenous tree species. 9. Other public utilities should be considered 10. Exit strategy should be put in place from the beginning of the project. 11. Organize field days to learn from each others. 12. The government to use the CBOs and UCCS to reach other farmers and more people should be encouraged to join these groups. 13. Proper planning with the communities should be done 14. Clear understanding between the stakeholders should be done at inception stage. 15. Encourage harnessing of roof catchment for future use. 16. Lobbying and advocacy should be integrated in the process for the common good 17. Support be given directly to the groups charging PMC only with responsibilities to help in proper utilization of resources 18. Sensitize on Cost Benefit Analysis (CBA)
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Plate 4: Participants presenting the outcome after field visit

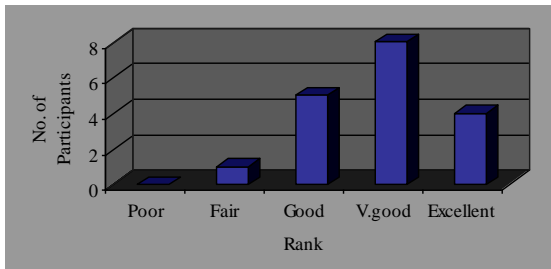
4.3 Workshop Evaluation

Were your expectations met?

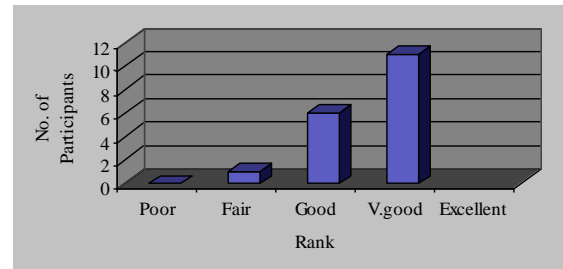


89% of participants indicated that their expectations were met. Those who said their expectation were partly met accounted to 11%. From the analysis, the outcome indicated that gap was the category that indicated what they would like to be met in a similar workshop. The key areas include:

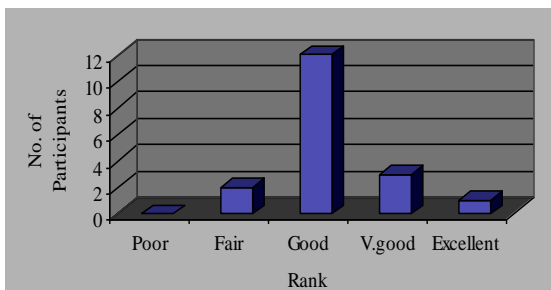
- Different soils for different crops
- Use of more visual aids and more examples.
- Water quality and standards.
- Soil erosion control methods.
- Detailed designs of water conservation structures
- Promotion of local innovations.
- More on agro forestry as soil conservation method.
- Processes of changing community attitude.
- Conservation practical in various places
- Practical on soil and water conservation
- More demonstration/field visits



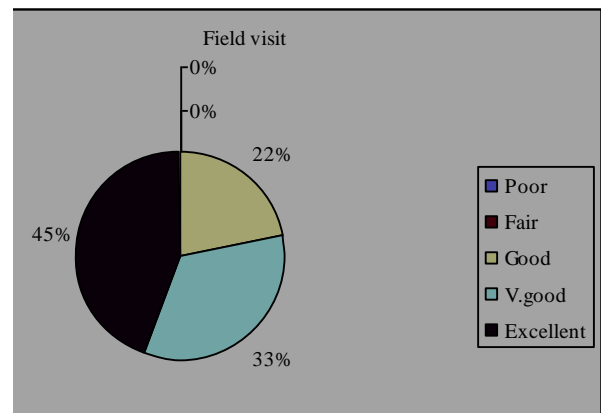
Communication prior to the workshop



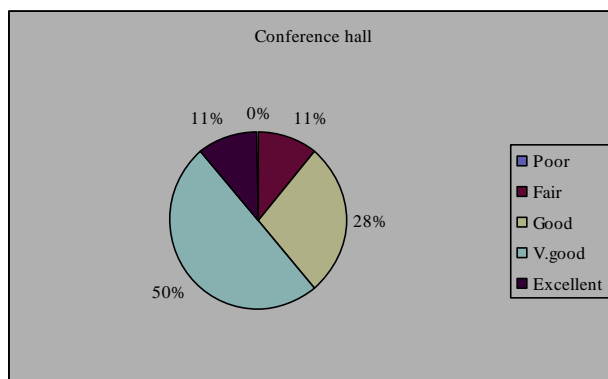
Workshop content



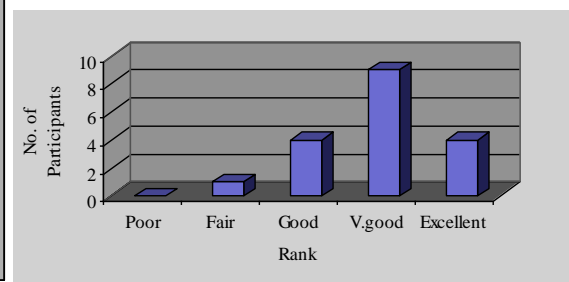
Workshop facilitation



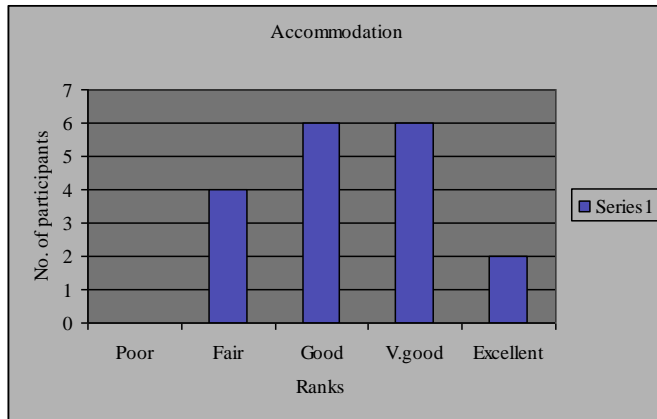
Field visit



Workshop conference hall



Meals



Accommodation

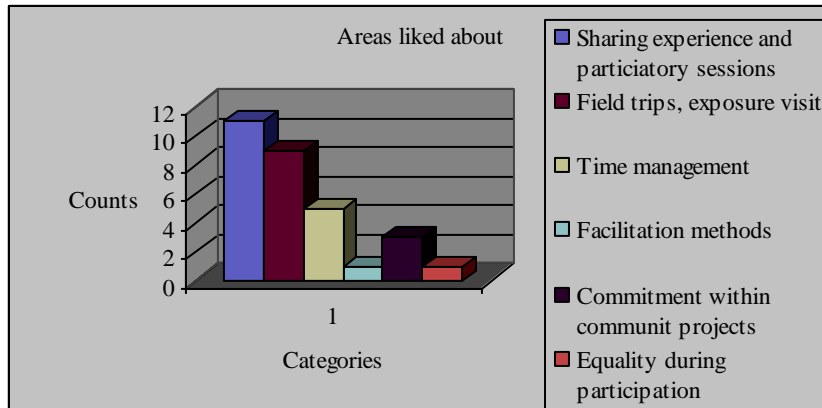
Did you learn any thing important?

All participants indicated that they learnt important things. Out of this the key ones have been clustered and indicated that:

- 60% learnt about construction of sand dam in phases makes it to be effective due to accumulation of sand that acts as a cover and also it will also allow water flow downstream.
- 25% learnt more on soil and water conservation and it was revealed that it had tremendously changed livelihoods.
- 15% indicated that the following areas were covered intensively.
 - Water sector reforms
 - Water discharge formula and water flow rates,
 - Water properties
 - EMCA 1999 and Water Act 2002

Others learnt that there is need for creating enabling environment between the line Ministries and our organizations. Local innovations and self reliance in projects were also highlighted as areas that were remarkable.

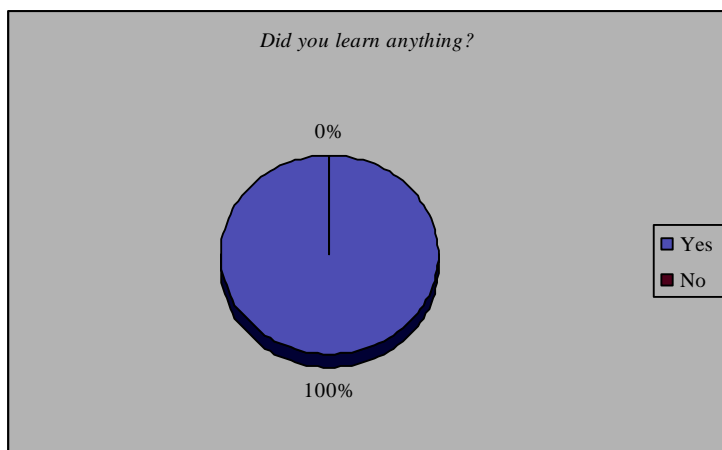
What two things did you like about this workshop?



What could be improved in a similar workshop next time?

From the analysis, areas that participants focused to be improved include:

- Be focused to timetable.
- The organizers should look for a secure and less noisy facility.



- Facilitation should be more on practical than theory.
- Gender to be considered on representation.
- The facilitator should look for a co-facilitator to break monotony.
- The management should improve on rooms and organizers ensure participants

are accommodated in one hotel for networking during free time.

- PELUM Kenya should also consider travelling days for reimbursement.

The organizers should insist on community wall in all workshops since it was remarkable in idea sharing.

4.4 Workshop Closure

1. Mrs Mary Kyengo



The closing remarks were delivered by Mrs. Mary Kyengo. She first congratulated participants for their compliance with the standard of the hotel. She then welcomed the workshop topic and encouraged participants to focus on the same route since it's the key in agricultural production and livelihood. She urged participants to become ambassadors of the hotel and she promised next time meal diversity will be highly observed since the organizations are in promotion of indigenous food diversity. She declared workshop officially closed at 5.40pm.

2. Participants

A Brief about MHAC

Mr. Nicodemus Nyongesa from MHAC briefed participants about the organization. MHAC was established as Non Profit Trust to promote BIA technology that enables 2-4 times more yield per unit land area than in conventional farming. It is based in Kitale, Trans-Nzoia County. The organization has trained over 200,000 people from different countries.



The overall goal is to facilitate environmental health and agricultural productivity learning through BIA.

The facility has demonstration gardens, residential hostels, lecture halls, livestock yards, agro-forestry demo

plots, workshop for fabrication of equipment, deliverables and health clinic for hire.

The main activities include training, research, extension, hosting conferences, catering/accommodation, organic food production, and consultancy services. Training courses offered are Diploma, Post Certificate Diploma, Certificate and three months course in BIA technology. Others courses include farmers workshops, tailor made courses, one day tour, mini training centers, study visit and library services. For more information visit Manor House Agricultural Centre or email: mhac@africaonline.co.ke or visit www.mhacbiointensive.org.

ANNEXES

Annex 1; Workshop Rules and Responsibilities

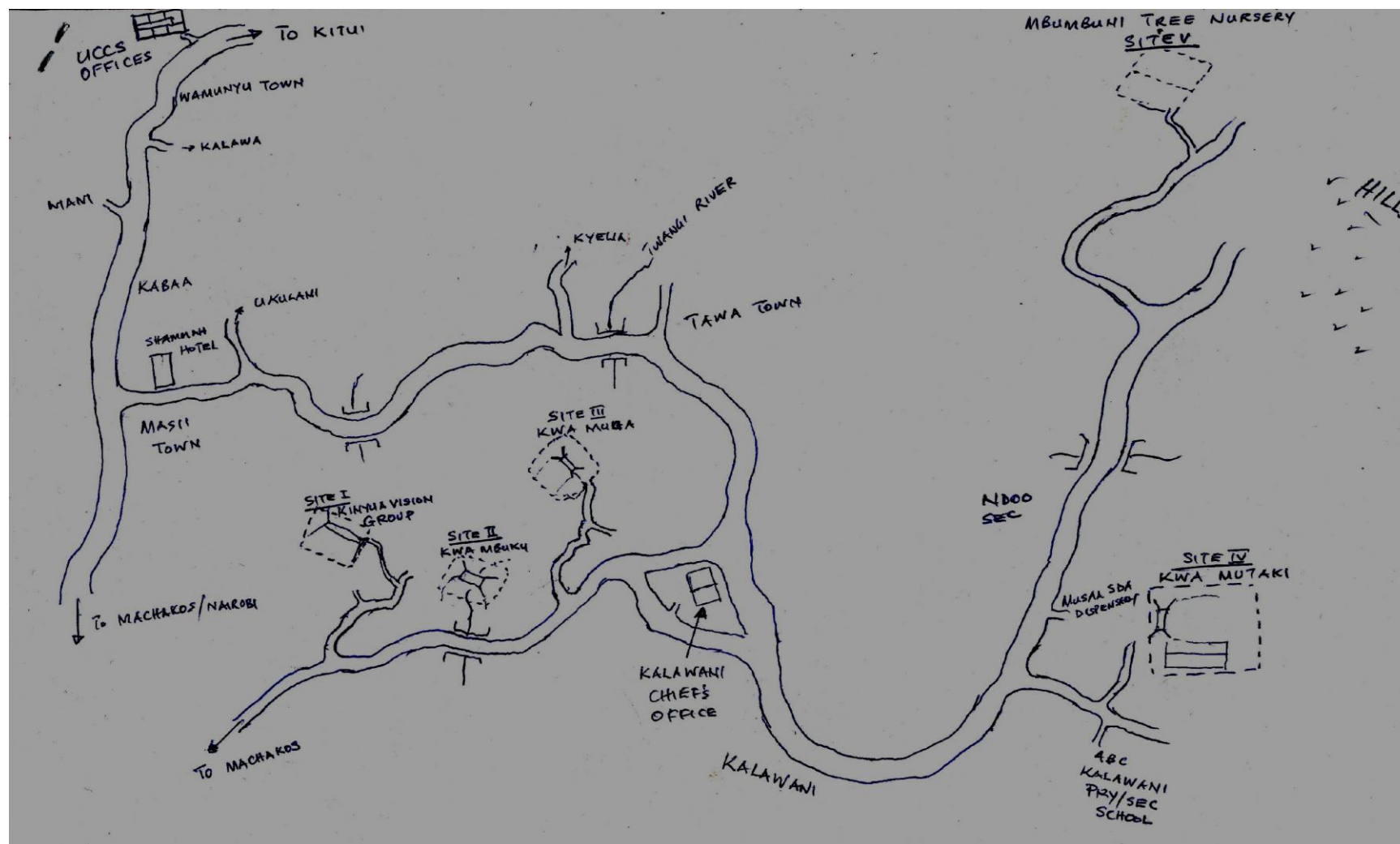
Rules

1. All phones should be in silent mode during sessions.
2. Ensure one meeting during sessions
3. Everyone should respect each other opinion
4. All participants should make and keep time
5. All participants should be active during discussions.
6. Prayer before and after every session.
7. The discussions should be controlled through the chairperson.
8. Control our view during field visits.
9. Ensure energizer during sessions.

Responsibilities

1. Time keeper –Lilian Owuonda
2. Energizer- Paul Simiyu
Eric Agandia
3. Spiritual Leader- Ezekiel Ndongoo
4. Chairperson – Ann Mbole
5. Welfare- Edwin Kang'ethe

Annex 2; Locational Map



Annex 3; Workshop Programme

Days	8.30-10.30am	10.30-11.00am	11.30am-1.00pm	1.00pm-2.00pm	2.00pm-4.00pm	4.00pm-4.30pm	4.30pm-5.00pm
Tuesday 17.07.2012	Welcoming remarks Introduction and expectations (Stephen Ngososei) About PELUM Kenya (Maryleen Micheni) Official Opening - UCCS	B R	Soil composition Soil types Soil structure (Stephen Ngososei)	L U	Principles of erosion control Conservation techniques (Stephen Ngososei)	B R	Group discussion (Stephen Ngososei) Video: Maryleen Micheni
Wednesday 18.07.2012	Recap of Day 1		Field trip (Facilitator UCCS)	N	Field trip (Facilitator UCCS)	E	Group work discussions and preparation for presentations
Thursday 19.07.2012	Recap ; presentation of field work Water properties Water cycle Water sources (Stephen Ngososei)	A K	Water discharge Water table Water Act EMCA Act Water quality and standards (Stephen Ngososei)		Water conservation techniques	A K	Evaluation and closing remarks

BUILDING PROJECT

FERRO-CEMENT TANK

This is what you will need:

- (a) strong wooden poles or timber - at least 2 metres long
- (b) clean sand
- (c) cement
- (d) 2 short lengths of pipe - one with a tap
- (e) galvanised wire mesh (chicken wire) with 12mm openings
- (f) galvanised fencing wire
- (g) at least 2 flat plasterer's trowels

Water tanks store rainwater from roofs. Tanks made of ferro-cement are fairly cheap, simple to make and easy to repair.

You do not need to use a lot of cement

because of the wire reinforcement. The cement mortar can be as thin as 50mm.

At first fill the tank very slowly. Cover the tank with a roof to keep out dirt and insects. Congratulations!

Let us know how you got on!

REPAIRS

If any cracks appear, empty the tank, chip away on each side of the crack and replaster. Again keep it damp for 2 weeks.

Decide on the size of the tank. It should not be more than 1.5 metres high for your first try.

Make a circle of the chosen diameter using a rope and 2 sticks.

While the mortar is hardening, you must keep it damp - for several days if possible. Old sacks or matting can help keep it damp.

Remove the poles carefully, fold down any loose mesh and plaster, finishing off with a top coat for the floor.

Keep it damp for at least two weeks before filling.

Drive in wooden posts at 250mm intervals around the inside edge of your marked circle.

Mix up the mortar.

3 parts sand 1 part cement 3/4 part water

The mix must not be too wet.

Begin plastering the tank walls with the mortar mix. This needs at least two people - one on the inside and one on the outside. They work together to stop the mortar falling through the mesh.

You must keep the cement damp and shaded. Drying too quickly will cause cracks.

Spread 25mm of cement mortar across the floor of the tank.

Prepare the walls by winding at least two layers of mesh between the poles, spiralling upwards.

Make sure the holes are not exactly opposite each other. Tie the mesh together with line wire.

The mesh should be strengthened by winding around ordinary galvanised fencing wire.

Fix a pipe for the tap in place 100mm above the floor and another at ground level for a washout, which is normally kept plugged.

Lay 2 layers of wire mesh across the floor of the tank between the poles. Leave at least 300mm of mesh to bend upwards.

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Annex 5; List of Participants

NAME	ORGANIZATION	POSITION	ADDRESS	TELEPHONE	EMAIL
1. Samuel Nzioka	ALIN	Field Officer	Box 10098, Nairobi	0728108209	nzausamm@yahoo.com
2. Julius C. Chemjor	ARDP- CDN	Field Extension Officer	Box 938, Nakuru	0722380890	juliuschemjor@yahoo.com
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12. Nicodemus Nyongesa	MHAC	Director	Box Private Bag, Kitale	0727786865	mhac@africaonline.co.ke
13. Lilian A. Owuonda	NASARDEP	Project Officer	Box 62, Rodi Kopany	0729524810	
14. Leah Wanjiku	NECOFA	Farmer	Box 3, Nakuru	0711547228	
15. Samwel Jakinda	NIA	Logistic and Water Dev. Officer	Box 366, Kajiado	0727777354	sjakinda@yahoo.com
16. Roland Mwalugha	PELUM	Driver/ Mechanic	Box 6123-01000, Thika	0718001443	mwalugha@pelum.net
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18. Maryleen Micheni	PELUM	RIM Programme Officer	Box 6123, Thika	0723540417	maryleen@pelum.net
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22. Moses Njenga	YARD	Extension Officer	Box 4781-01002, Thika	0728009782	yardcommunitydev@yahoo.com
23. Stephen Ngososei	RISDEV	Coordinator	Box 4648, Eldoret	0722275582	risdev58@yahoo.com