

KUJENGA MAISHA EAST AFRICA-KUMEA



LEADERS' ORIENTATION FORUM FOR EMUHAYA SUBCOUNTY, VIHIGA COUNTY AT WESTVILLE HOTEL OPPOSITE MULUKHORO ON TUESDAY, 16TH JANUARY, 2024

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KUMEA REPORT

JANUARY-2024

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1.0 EXECUTIVE SUMMARY

The project orientation forum for Integrated Rural Development project for Emuhaya Sub county in Vihiga County was held on 16th January,2024 at West Ville hotel, Mulukhoru. The objective of the workshop was as follows:

- a) Enhance participants understanding of project rationale and the various project components*
- b) Define the roles of various partners and stakeholders in implementation of school health*
- c) Develop plans for project implementation*
- d) Share experience in project implementation and participation process*
- e) Enhance community involvement and participation in the Integrated Rural Development Project*
- f) Prepare action plans for project initiation and implementation*

The workshop had a total of 45(33men and 12women) participants drawn from Community self-help groups, Sub county Department of Agriculture, Kenya Forest Research Institute, Sub county Department of Water, Sub county Department of Public health, Sub county Department of Social Services, Ministry of Education and Nation Government Administration Agents drawn from Emuhaya sub county of Vihiga County.

Facilitation of the workshop was done through presentations and discussions on the key issues based on the project core components. The Facilitator presented diverse project components and the participants were able to participate actively in plenary discussions

The outcome of this process has been the planning implementation of project activities with active involvement of community groups and key stakeholders in defining their specific roles in project implementation.

The end of workshop process revealed that the workshop objectives were in majority achieved: -

- ❑ Participants have enhanced their appreciation and understanding of the key project components i.e. Ferro-cement tank construction, spring protection, hand dug well construction, School Sanitation based on VIP latrines, organic farming, drip irrigation, Ecological sanitation, Fish farming, Dairy goat farming and natural resource management*
- ❑ The learning sessions have added the confidence of the workshop participants in putting mechanism in place to raise the required materials for construction of the water and sanitation facilities*
- ❑ The target schools are aware of the criteria for engagements and participation towards achieving sustainable project out puts*
- ❑ Enhanced community planning process through the implementation of Participatory Rural Appraisal process in the target sub counties with respective community groups and community facilitators*
- ❑ Key stakeholders including the Ministry of Education, Kenya Forest Service and Sub county department of agriculture agreed to participate and scale up support during project implementation*
- ❑ This significant learning event has enabled participants develop specific plans that will facilitate better partnerships for implementation of Project activities with participation of target schools and identified Water point development sites in liaison with Community groups involved in rural livelihoods promotion i.e. horticulture production and agroforestry.*

2.0 WORKSHOP PROCESS-16th JANUARY,2024

ACTIVITY 1: PARTICIPANTS INTRODUCTIONS & WORKSHOP CLIMATE SETTING

Purpose

To reduce social distance, informally build group spirit and break the ice among participants with view of improving/facilitating interaction

Participants discussed and agreed on the following workshop norms and leaders

WORKSHOP NORMS

1. Phones on silent mode
2. Minimize movements
3. Respect each other's opinion
4. Active participation
5. Keep time

ACTIVITY 2: WORKSHOP OBJECTIVES & PARTICIPANTS EXPECTATIONS

Purpose

Participants to appreciate the need for the project and express their expectation and compare them with the workshop objectives

HOPES	FEARS
<ol style="list-style-type: none">1. Address Climate Concerns2. Utilization of Appropriate technology for sustainability3. Adaptation of Modern farming technology4. Engage Community to support the project5. Adequate information to change the community livelihoods6. Interactive session with partners7. Define Role in supporting the project8. Ensure community Development9. Improved sanitation for schools and effective partnership with community10. Improvement of Rural development in target villages11. Define project Implementation strategy.12. Understanding of KUMEA and its role in development13. Improved Networking with partners and other stakeholders	<ol style="list-style-type: none">1. Inadequate land2. Failure towards achieving project objectives3. Conflict of interest during project implementation4. Inadequate capacity for Project sustainability.5. Inadequate participation of communities.6. Stalling of projects7. Contrary Expectations from communities8. Inadequate food for community food sufficiency9. Project duration and achievements of project components10. Rains interference with deepening of water points11. Inadequate capacity to manage New initiatives12. Negative Discussions after the meeting

WORKSHOP OBJECTIVES

1. *Enhance participants understanding of project rationale and the various project components*
2. *Define the roles of various partners and stakeholders in implementation of Integrated Rural Development Project*
3. *Develop plans for project implementation*
4. *Share experience in project implementation and participation process*
5. *Enhance community involvement and participation in the Integrated Rural Development*
6. *Prepare action plans for project initiation and implementation*

ACTIVITY 3: OVERVIEW OF KUJENGA MAISHA EAST AFRICA-KUMEA

Purpose

To understand and appreciate the role and mandate of Kujenga Maisha East Africa in facilitating project development and quality of life improvements in various development sectors

Development Sectors	Key projects & interventions
Water ,Hygiene and sanitation	<ol style="list-style-type: none"> 1. Eastern Kenya Water and Sanitation Improvement project-EKAWASIP Completed 3years ago with water and sanitation facilities done for over 64 schools in Kitui and Makueni(Construction of 16 hand dug wells fitted with hand pumps, Construction of 21 ferro-cement tanks in schools and construction of 55 VIP latrines in schools) 2. Kitui community Borehole Project-Drilling and equipping boreholes for community water supplies 3. Mukuru informal Urban Livelihoods-Construction of bio-center and provision of safe water and management of project components by women &youth groups 4. Afya Jijini/USAID funded project targeting 3no.informal settlements in 3No. sub counties of Embakasi, Starehe and Makadara in Nairobi County- On-going
Rural &Urban livelihoods	<ol style="list-style-type: none"> 1. Support farmers with Provision of dairy cows in Western Kenya for improved livelihoods-Kakamega County 2. Support bee-keeping initiatives in Kitui County 3. Support Igembe Phase 1, Phase 2 & Phase 3 Project through provision of Dairy goats, horticulture production in target schools & villages and bee-keeping 4. Support dairy goats project in Western Kenya -Vihiga, Kakamega, Busia and Siaya Counties 5. Mukuru Urban Livelihoods & Bio center &other micro-economic projects for women &youth groups
Drought recovery& emergencies	<ol style="list-style-type: none"> 1. Support Lake Baringo floods relief by provision of foodstuff packages, construction of houses for afflicted families, construction of classrooms &dormitories for afflicted schools and support household sanitation construction 2. Provide relief support to drought stricken families and households in Baringo County 3. Provide support to pastoral communities in Turkana County with Livestock restocking program 4. Provision of relief food and support in Kitui, Baringo and parts of Turkana 5. Support Mukuru informal settlement residents with foodstuff packages during COVID -19 epidemics due to closure of economic livelihoods-factories &curfew restrictions 6. Support Mukuru informal settlements with foodstuff packages &bedding materials due to slum demolitions

ACTIVITY 4: OVERVIEW OF INTERGRATED RURAL DEVELOPMENT PROJECT

Purpose

To make participants understand the project objectives and activities hence define their roles in project participation and implementation.

4.1 Project Goal

Improving Quality of life for women and school children through sustainable rural livelihoods and horticulture farming

4.2 Specific Intermediate Objectives

- a) Improve access to safe water for utilization by community members and schools
- b) Improve community natural resource management and sustainable agriculture production
- c) Improve capacity building of various community and farmers group to sustain various project activities & components

4.3 Key project components & activities

Intermediate Objectives	Key components & activities
1. Improve access to safe water for utilization by community members and schools	<ol style="list-style-type: none"> a) Facilitate Construction of 12no. Ferro-cement water tanks in 12no. schools b) Facilitate Construction of 12no. Shallow/hand dug wells fitted with solar pumping system in 12no. villages for community farmers' groups c) Support construction and protection of 12no. springs
2. Improve Sanitation & hygiene in schools	<ol style="list-style-type: none"> a) Construction of 12no. Ventilated Improved Latrines (5door Latrines) in 12no. target schools b) Facilitate hygiene & sanitation promotion in 12no. target schools c) Provide hand wash equipment for target schools d) Promote menstrual hygiene in target school
3. Improve community natural resource management and sustainable agriculture production /Fish farming & production	<ol style="list-style-type: none"> a) Establish organic farming & tissue banana production with 12no. farmers' groups b) Establish 36no. Vegetable production farms in the 4no. sub counties via drip irrigation c) Facilitate establishment of 12no. Fishponds/production at 12no. spring water points d) Orientation on ecological sanitation & agroforestry in 12no. villages
4. Support Dairy goat farming & Agroforestry	<ol style="list-style-type: none"> a) Support women farmers' groups in each sub county with 44no. dairy goats (40 Does and 4bucks) b) Training of Women farmers' groups in Dairy goat management c) Promote agroforestry among the dairy goat farmers
5. Improve capacity building of various community and farmers group to sustain various project activities & components	<ol style="list-style-type: none"> a) Community & Leaders Project Orientation forum b) Water resource management training for Community resource persons from 36no. water points c) Conservation farming & Tissue Banana training for target farmers' groups d) Participatory Rural Appraisal in the 4no. sub county for needs assessment & site selection
6. Undertake Participatory project monitoring & evaluation	<ol style="list-style-type: none"> a) Quarterly review forums for project progress reviews in specific per sub county b) Community site meetings

ACTIVITY 5.0: KEY PROJECT COMPONENTS

Purpose

Understand various project components, implications of effectiveness and sustainability

5.1 Full Community Participation in All Project Activities

Development projects have found that without full participation, communities generally fail to develop an adequate sense of ownership over resulting community facilities and benefits and therefore fail to carry out those requisite actions that ensure long-term, independent sustainability of those facilities and benefits. To avoid this the project will insure communities fully participate in all decisions effecting community –level activities, in all planned community level implementations and in all utilization of community-level human and material resources.

To insure full community participation and strong sense of local ownership, the project will adapt three key elements: the use of the PRA (Participatory Rural Appraisal); Community implementation of activities; and cost sharing.

Use of PRA-PRA is a noted methodology for facilitating communities to fully participate in and control their own development. It is a non-literate based methodology that insures all community members can, regardless of their educational background, fully participate. This is especially critical in traditional societies where often the most influential community members are non-literate elders and where female literacy rates are lower than that of males. To further insure that PRA activities are fully accessible to all community members, the methodology emphasizes the use of locally available materials. A typical example is mapping, where such simple items as sticks, leaves and pebbles are used to draw map of the community on the ground.

Within this methodology, the role of project staff is primarily to facilitate and listen, thereby maximizing local input and minimizing the role of “outside expert”. Project staffs simply facilitate community members through a self-directed process of problem identification followed by identification and analysis of locally feasible interventions.

PRA will continue to be used extensively during initial community mobilization activities. This is to ensure that fully community participation in decision-making occurs at the immediate start of each village’s project participation. Community selected representatives (PRA teams) will use participatory tools –such as community mapping, transect walks through community, household discussions, timelines, collection of technical data, institutions analysis, problem ranking and decision-making matrix –to thoroughly investigate and report back on, to the whole community, local need and capacity to intervene. The key element here is the immediate and full involvement of the community in the decision making process.

5.2 Construction of Water Points

The project will construct water points based on appropriate technology and feasibility assessment of various sites identified. Water points to be constructed will include construction of hand dug wells and Ferro-cement water-tanks

The project staff will oversee the commencement of water point construction. For well construction, upon confirming of ground water availability and potential for hand digging, the well construction process will start with community digging. Once community members dig to the water table, the artisans will undertake the deepening process and lining of the wells with rings. Once the yield is confirmed after deepening and lowering of rings, apron construction will be done followed by cover slab and solar pump installation.

Ferro-cement tank construction will be done immediately the school has been identified for water point and the school has also contributed the relevant local available materials for tank construction.

Efforts will be made to promote household tank construction for household domestic use and replication by community members.

During water point's construction, on-going (often-daily) follow-ups will be carried out by the projects officer-Water and Irrigation

5.3 Rationale of Ferro-Cement Water Tanks

One of the primary requirements of a water harvesting system is that of containers to store the harvested water in a hygienic condition. This need is more pronounced in high-rainfall areas, where it is more feasible to store water in containers for direct use, rather than for recharging the groundwater. Generally, in small domestic systems, the cost of constructing tanks with conventional materials like masonry or RCC is far more than that of the rainwater collection and piping component. Ferro-cement can provide a low-cost and easy-to-build solution to the need for low-cost containers. This technology is particularly relevant for regions that have rainfall or arid & semi-arid areas

The Structural Engineering Research Centre (SERC), Ghaziabad, has done research and development on a large number of low-cost structures and implements like water/grain storage containers, irrigation channels, biogas digesters and septic tanks, primarily using ferro-cement. SERC scientists are imparting training in ferro-cement technology to rural artisans under the National Drinking Water Mission.

Ferro-cement containers can be used to store grain and seed, apart from water. Tanks of 1000-2000 litre capacity can be constructed with ease, which are much cheaper than masonry, RCC or plastic tanks. These are easy to repair, and can be easily transported because of their sturdy nature. Such containers have been used on a wide scale since about the past 25 years in Thailand, Malaysia and some African countries. Ferro cement containers with capacity as much as 5000 litres have been constructed in Thailand.

5.4 Ferro-Cement Tank Fundamentals & Designs

Ferro-cement consists of a thin sheet of cement mortar which is reinforced with a cage made of wire mesh and steel bars. Because Ferro-cement is structurally more efficient than masonry, the thickness of the walls of the container are as low as 10 to 15 mm. Ferro-cement components can be casted in any shape using suitable moulds. The technology is extremely simple to implement, and even semi-skilled work persons can learn it with ease. Ferro cement requires only a few easily available materials - cement, sand, galvanized iron (GI) wire mesh, and mild steel (MS) bars - in small amounts compared to masonry and RCC.

Ferro-cement is essentially an extension of conventional reinforced cement concrete (RCC) technology. As such, all the benefits attributed to use of RCC in construction normally apply to ferro-cement as well. There are, however, other advantages that make ferro-cement a preferred choice in many construction projects. It is a thin-walled construction consisting of rich cement mortar with uniformly distributed and closely spaced layers of continuous and relatively small diameter mesh (metallic or other suitable material). Compared to other cement concrete structures, those made of Ferro-cement are light weight (use less material, and therefore, also environmentally benign), tough, durable, crack resistance and can be made into virtually any shape. It is a low technology construction in that it does not necessarily require highly skilled labour and complex construction methods, sophisticated or heavy equipment or manufacturing in a plant, and yet a good performance in construction can be achieved. Finally, it is more economical than other concrete or masonry constructions and can easily be repaired, if necessary.

To start, a comprehensive modelling procedure and analysis of a typical tank was carried out with an objective to understand the structural behavior of the tank, to replicate and predict its response to various loads (e.g. hydrostatic), and to evaluate the serviceability state. A full three-dimensional finite element model (FEM) of the tank, including the associated components, was constructed and analyzed using SAP2000 software. Both the wall and the roof were modelled using shell elements. Results of analysis primarily contain the deformation and the stresses caused by the applied loads. These results were used

for checking the safety and serviceability requirements of the tank. Upon evaluating the results, it was found that the maximum stresses under full water load condition are within the acceptable (safe) limits. In other words, the proposed system is safe for full water loading and reasonable live load on the roof. A number of books, research documents, technical publications, existing design codes, guidelines and recommendations dealing with Ferro-cement and laminated cementitious composites were extensively consulted. The final design was based primarily on Ferro cement Model Code (Building Code Recommendations for Ferro-cement (IFS-10-01), January 2001). In addition, the performance of more than 20 Ferro-cement water tanks built under the technical supervision of IFIC over a period of 10-15 years was evaluated. to identify the system offering the most cost-effective and desirable short and long-term performance. The basic design followed the concepts and general principles in current use in structural engineering, particularly for reinforced and pre-stressed concrete structures. The structure was designed to satisfy a number of limit states, where a limit state is defined as the boundary between acceptable and unacceptable performance. Practical design guidelines to ensure good serviceability of Ferro-cement structures were based on allowable stresses under maximum service load, maximum crack width, fatigue life, durability and corrosion, and deflection limitations. Accordingly, design parameters were defined for:

- The cover to the first layer of reinforcement;
- Thickness of wall and roof members;
- Size of mesh opening;

Skeletal reinforcement depth, volume fraction of the reinforcement and specific surface of reinforcement;

- Number of mesh layers, mesh opening area and wire diameter; and
- Fineness of matrix (mortar). Though the final design was based primarily on the relevant Ferro-cement Model Code, the skeletal reinforcement and wire mesh requirements computed based on the code were modified and verified experimentally. The code based calculation showed that more than 4 layer of wire mesh need to be provided but this was reduced to 2 by taking into account the contribution of skeletal steel and providing additional stiffeners (steel channels and the roof trusses). The proposed design significantly reduces the cost of the tank without affecting its structural integrity, safety and performance. The finite element analysis was also used to verify the adequacy of the design.

The following are the key rationale for selecting the technology

- 1. Low Cost technology**
- 2. Ease of Construction**
- 3. Appropriate Skill and technology requirements**
- 4. Availability of local materials for construction i.e. sand, stones and ballast**
- 5. Short and long term performance**
- 6. Adaptability to the environment –able to blend in all climatic and environmental situation**

5.5 .0 Rationale for Solar Pumping Systems &Installations

5.5.1 SOLAR PUMPING SYSTEM

There is very little technically that can go wrong with a solar system if it has been installed correctly. The submersible pump in combination with the control unit has a number of safety features that protect it in the event of problems occurring. Whilst it is very “hi-tech”, the high level of reliability, minimal maintenance, need for spare parts and low operating costs make it appealing for rural locations. The main threat to the reliability of solar systems is human interference.

a) Submersible pump

The submersible pump is manufactured to a very high specification and will operate on a daily basis without problem for at least 5 years, probably many more. The motor is contained within the pump and is cooled by the water passing over it. It has built in protection features, which together with the control panel ensure that it is protected from risk of overheating, drop in water level, voltage irregularity.

b) Control unit(s)

Depending on the system in place there may be a simple on/off control unit or a more complicated looking control panel with digital display. In the event that there is a backup power source, there may be two switches or control units. These are to protect the pump, should not be tampered with in any way and should only be installed and maintained by a qualified electrician. The most common reason for solar pumps getting damaged is because an unqualified person tried to fix it. Incorrect wiring can bypass the inbuilt protection features of the system and cause brand new equipment to be permanently and irreparably damaged.

c) Solar panels (photovoltaic modules)

These have no moving parts and there is very little that technically can go wrong with them. Consequently many of them have a 20 year manufacturer's guarantee. The main risks to the panels is from theft, vandalism or children throwing stones which causes damage. Theft in particular is a major problem in most areas so Community farmers groups need to ensure thorough security measures are in place to minimize these threat and panels are well secured. The only maintenance required is regular (at least weekly) cleaning of dust from the panels. Collection of dust will significantly reduce the effectiveness of the panels.

Lastly and also related to human interference, maintenance by unqualified technicians is a major cause of broken pumps. Only a trained electrician with prior experience of solar pumps and access to manufacturers catalogue containing the technical specification of the equipment, should be allowed to undertake repairs related to the wiring of the system or control panel. If there is a major overload or fault with the system, the control unit will fail as a protection measure to protect the pump. This is a warning that qualified expertise is required to investigate the nature of the problem. However, all too often, unqualified technicians try to bypass the control unit and wire the pump directly to the power source, bypassing the inbuilt protection features. This will inevitably lead to major failure and likely destruction of the whole system.

5.5.2 Troubleshooting for Submersible Pumps

All remedial action to be taken by skilled Technician

1. Pump motor fails to start	<ul style="list-style-type: none">a) Broken or loose electric connectionb) Blown fuse- check the installation before replacing fuses Motor overloadc) Low voltaged) Damaged supply cable insulation- check insulation resistancee) Cable- cable joint or motor windings may be wet or earthedf) Impeller plugged (Pump blocked with sand)
2. Little or no water delivered	<ul style="list-style-type: none">a) Pump not submergedb) Pump rotating in the wrong directionc) Leak(s) in riser pipe joints or corroded piped) Non-return valve in pump blocked or corrodede) Valves or discharge line blocked, damaged or not full openf) Worn pump due to pumping sand or other particlesg) Strainer or impellers blocked with sand or chemical depositsh) Blocked or damaged borehole screeni) Pumping head too high for pump
3. Loss of Delivery	<ul style="list-style-type: none">a) Pump runs dry due to excessive drawdown (if not protected by a low-level cut-out)b) Leak in riser pipe- pull out and repair pipe
4. Overloads trip	<ul style="list-style-type: none">a) Current overload/motor temperature sensor- possible causes: blockage, insufficient flow of water over motor, overload due to mechanical problems, low voltageb) Under-voltage- Low voltage on supply systemc) Incorrect oil level in dashpot operated overloadsd) Low-level cut-out – excessive drawdowne) Incorrectly set overloads- check settings

5.5.3 Potential problems affecting water projects

1. Technical difficulties/breakdown
2. Lack of trust in committee and community group
3. Misuse of water
4. Personality clashes/local disagreements within village
5. Poor community cohesion
6. Rumours of financial mismanagement
7. Political interference
8. Lack of, weak or divisive leadership
9. Misuse of project funds
10. Lack of accountability
11. Sabotage of project infrastructure
12. Abuse of power
13. Political interference
14. Poor planning

5.5 Support Dairy goat farmers' groups & Agroforestry promotion

Purpose

To improve community livelihoods and incomes the project will promote dairy goats farming due to small-farming systems in the county.

5.5.1 Rationale for dairy goat farming

Dairy goat rearing is very beneficial for farming families, apart from the milk which is very nutritious, goat meat is also a delicacy for many households. Goats can also be used to provide manure for the farm and also earn the farmer more income. With limited capital a farmer can start a dairy goat project and be able to reap benefits from it within a short time.

5.5.2 Criteria for dairy goats' allocation to target groups

The project to provide dairy goats to 1 no. group in each of the 4 target sub counties. The groups to ensure the fulfill the following criteria

- a) Household benefitting from dairy goats to construct stables as per the livestock department design
- b) Individual contribution for revolving fund between Kshs. 3,000 to 5,000 to cater emergency needs of the dairy goats
- c) Able to provide adequate feeds and participate in agroforestry activities for fodder production

5.5.3 Key rationale and aspects of dairy goat rearing & management

Rationale	Key Aspects
<p>1. Goat's milk is good! Goat's meat is tasty!</p>	<ul style="list-style-type: none"> a) Goats Milk is easy to drink and is a richer food because it has more calcium, phosphorous and chlorine than cow's milk. b) Milk is used at home so that the family get the best milk - if there is a cow many farmers will sell the cow's milk for cash and make sure the family gets the goat milk to drink! c) Tasty Meat! Goat's meat is very tasty and it is juicy and eaten often by many people d) More and more people are learning about how good goat's milk, cheese and yoghurt are so there is a growing market. e) Goat's milk is better for the family as it has a "High Nutritional Content." This means it is a very high quality food and very good for young and old. f) Some people cannot drink cow's milk. They have an "allergy" to it. This is why some children are reared on goat's milk when cow's milk and all else has failed. Nobody is allergic to goat's milk!
<p>2. Make more money & Improved livelihoods</p>	<ul style="list-style-type: none"> a) Get cash from selling milk; b) get a higher price for goat milk; c) get kids every year (twice per year) and sell them easily when ready; d) kids can be twins/triplets; e) with small farm sizes it is a better way to earn money and feed the family; f) in the space and using the same feed you need to keep a cow you can keep six goats; g) goats do not need big areas to graze like cattle; h) farmers can pay school fees using income from sale of milk/manure; i) resulting products are fast and easy to sell; j) goats sell easily for meat, k) many people prefer goat cheese; l) start getting benefits quickly; m) good for people who do not have a lot of money to start with; and n) goats make very good manure. oats use small doses of drugs - cheap and easy to maintain
<p>3. Goats are good for the farm</p>	<ul style="list-style-type: none"> a) Less feed is needed to keep a goat than a cow; b) goats will eat many different plants - so they are easier to keep fed through the year; c) droppings are used as manure for organic farming; d) goats are good at keeping bush under control - they stop too much shrub growth; e) goats will live even where there is a drought as they do not need a lot of water and can go for quite a long time without water in very dry times.
<p>4. Goat rearing do not require so much work</p>	<p>Goats require less labour and time per head compared to cattle.</p>
<p>5. Important for Social events</p>	<ul style="list-style-type: none"> a) Goats are used traditionally as payment of dowry; b) goats are often eaten during land cases, parties, clan meetings, etc.; c) goats are important in some rituals, they are used during circumcision ceremonies for example; and goat horn and bone are used in the traditional craft industry.

5.6 Community Contribution and Participation in School Water Project

Purpose

Understand the rationale of community participation and contribution in attainment of project sustainability and development of replication potential

Development projects have found that without full participation, communities generally fail to develop an adequate sense of ownership over resulting community facilities and benefits and therefore fail to carry out those requisite actions that ensure long-term, independent sustainability of those facilities and benefits. To avoid this the project will insure schools fully participate in all decisions effecting water and sanitation projects, in all planned implementations and in all utilization of human and material resources.

To insure full community participation and strong sense of local ownership, the project will adapt three key elements: the use of the project orientations forum for planning implementation and discussing the role of all the stakeholders and cost sharing during construction of water and sanitation facilities.

The following is a list of materials for construction of Ferro-cement water tanks

Type of facility	KUMEA Contribution	School /Community contribution
Construction of Ferro-cement water tank 30,000 litres capacity	1.40 bags of Cement 2. 20kg water proof cement 3.1No.BRC roll no. 142A 3.1no. Chicken wire 4.Skilled labour for tank construction 5.Production & installation of gutters -30pc and down -10pc gutters including assorted brackets 6.Supply scour system &taps 7.10pc ¾ “ pipes for water extension to the school garden 8.PVC Bends & Elbows(4”) 9. PVC Waste Pipe -4” Inch 10. Timber 6x1-20m	1.14tons of sand 2. 7tons of hard core 3. 7tons of ballast 4.30pc gunny bags 5.30pc poles 6.unskilled labour -3people 7.Food & accommodation for 14days 8 Supply of 200 bricks 9.Supply of water for construction

5.7 Overview of Ventilated Improved Pit latrines(VIP) for School Sanitation Improvement

Ventilated Improved pit latrines, commonly known as VIP latrines are an improvement to overcome the disadvantages of the simple pit latrines. The main problems associated with traditional simple pit latrines, i.e. fly and mosquito nuisance and unpleasant odors are effectively minimized by the action of a vent pipe, fly screen and a squatting cover in the VIP latrines. The whole system is properly engineered as an effective sanitation option for both rural and urban areas by designing the pit either as single pit or an alternative twin-pit system. The single –pit can be emptied mechanically. In case of permanent superstructure, an alternating twin-pit system permitting safe manual removal of the digested solid may be installed.

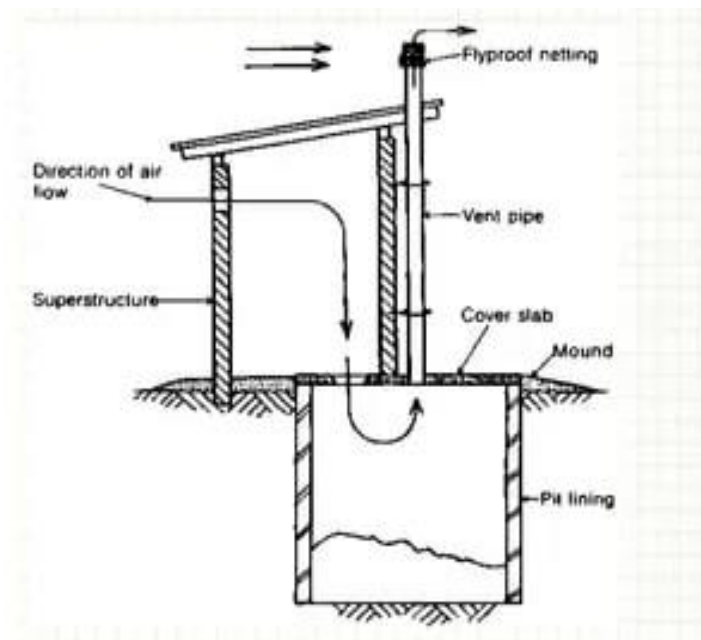
Ventilated improved pit latrines receive excreta in the same fashion as those of the simple pit latrines, by direct deposition through a squat hole or pedestal seat. The liquid part infiltrates into the surrounding soil and the faecal solid are digested anaerobically, gradually accumulating and eventually requiring emptying of the pit for further use. The vent pipe and the fly screen which keep the latrine free from flies, mosquitoes.

Elements of VIP Latrines

The basic elements of ventilated improved pit latrines

Element	Description
1. The pit	The pit can either be a single pit or alternating pit; in either case , the pit should be lined with open jointed brick work or prefabricated concrete rings ;The lining prevent the soil collapse during emptying operations or during heavy rains, and the open joints allows liquid to infiltrate into soil.
2. A cover slab	A cover usually reinforced concrete which covers the pit and has two holes –the squat hole and the other for the vent pipe
3. A superstructure	A superstructure for privacy and protection from rain and sun which can be built according to the choice of the users.

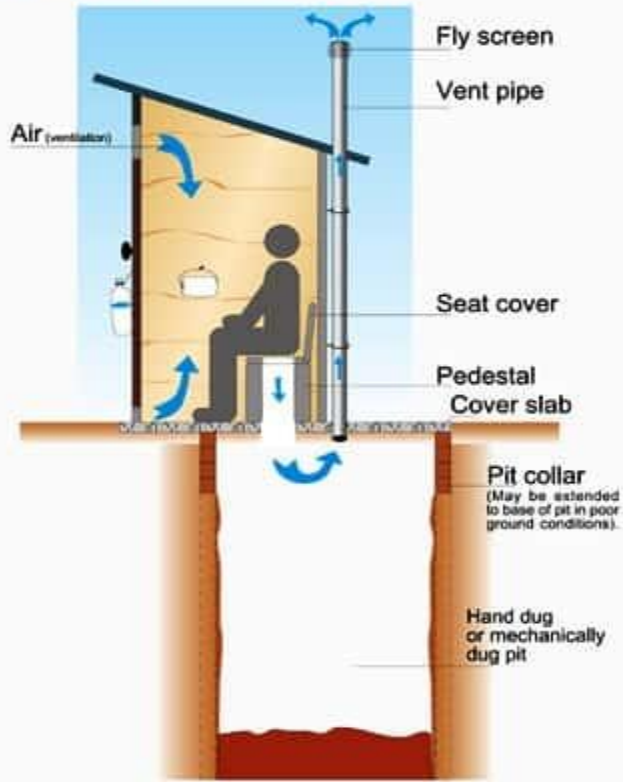
A SKETCH VIEW OF VENTILATED PIT LATRINE DESIGN & CONCEPT



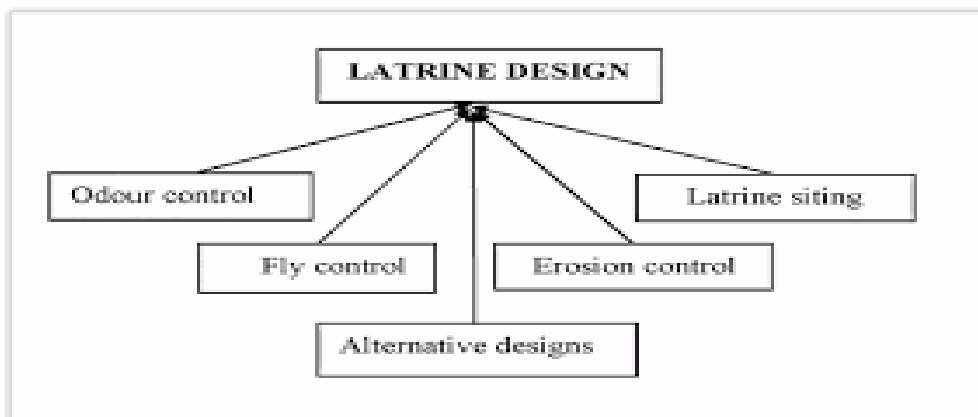
Key aspects of Ventilated Improved Pit Latrines Design

Dry on-plot systems

Ventilated Improved Pit (VIP) toilet



Profile view of Ventilated Improved Pit latrine



Advantages & Disadvantages of VIP Latrine

Advantages	Disadvantages
<ol style="list-style-type: none">1. Controls odor and insects2. Minimum Health risk3. Low Cost4. Easy construction and maintenance5. Minimum Water requirement6. Twin-pit VIP Latrines offers a long term solution	<ol style="list-style-type: none">1. Potential for ground water pollution2. Lack/Inadequate space for relocating the pit in densely populated areas3. Difficulty of construction in rocky and high water table areas

5.7 Spring protection and construction

Springs occur where water from an underground aquifer flows out of the ground to the surface. The spring can occur where the water flows out of the ground by gravity, or it could be an artesian spring where the water appears at the surface under pressure from a confined aquifer below. The point at which the water reaches the ground surface is known as 'the eye of the spring'. Spring water can be of good quality microbiologically if the spring is well protected. Spring water can in some areas however, can have the same levels of chemical constituents as other forms of groundwater. Some springs flow all the year around and some springs only flow for part of the year. It is very important when deciding on which spring to protect that local knowledge is used, particularly the knowledge of women and elders, to identify which springs are known to be the most reliable.

5.7.1 Selection of springs

The selection of springs to protect for water supply should consider the springs' yield versus the demand, its reliability through the seasons and during years of drought, the quality of the water, vulnerability to landslides and erosion, and who the existing users are and in particular whether they will accept the spring being protected and used for new communities. Wherever possible the springs yield should be measured at the end of the dry season to determine the minimum expected flow. Checks should be made that the spring is not in fact a stream which has passed underground and re-appeared downstream as the water quality is then likely to be poorer. Sometimes water is also taken from a stream which is fed from one or more springs. The problem is that when it rains the water turbidity will have increase which will cause additional problems for treatment, particularly if chlorination without pre-treatment is being undertaken in a camp scenario or a local settlement. Springs can be protected and supply water in the following ways:

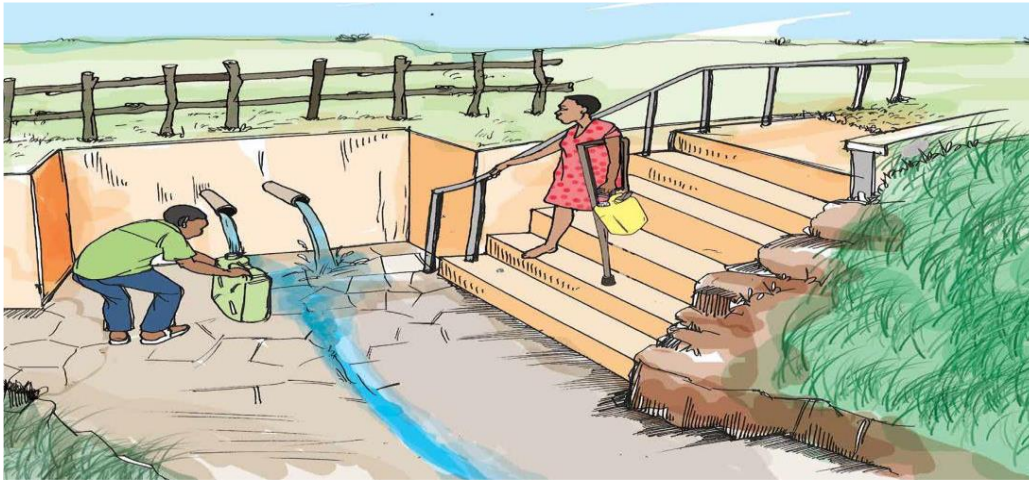
- a) Simply have a free flowing pipe passing through a catchment structure where water can be directly collected by users
- b) Have a collection chamber with valve chamber and an open system where the water flows freely through a pipe to the users. This system is called an 'open system'.
- c) Have a collection chamber with valve chamber and then the outlet pipe feeds into a storage reservoir where the water is collected over night. This reservoir feeds through another pipe to a tap. This system retains as much water as possible and is called a 'closed system'. It is used when the yield is lower in proportion to the demand.
- d) The second two systems may also have some form of sedimentation tank or filter after the spring box if there are particular problems with solids or turbidity in the water.

5.7.2 Spring Protection principles

- a) Protect the catchment area above the spring from animals and humans to prevent contamination.
- b) Constructing a cut off drain above the spring prevents contaminated water from entering or mixing with the spring water.
- c) No latrines should be located within 30m upstream or downstream of a spring.

- d) After cleaning or opening up the area around the eye of the spring, the spring should be protected with loose stones and gravel and then a soil cover behind the catchment wall, in addition to possibly also a spring box and a pipe for delivering the water to the users.
- e) The area around the spring should be fenced to prevent access by animals, but overflow water should be directed to an area outside the protection zone where the animals can take water, particularly in pastoral areas.
- f) The spring box should be cleaned out on an occasional basis.
- g) The local community and users of the spring should be trained in the correct maintenance of the spring inlet and system and in the rationale for the protection of the catchment areas. Local legislation may also be useful in protecting the catchment area above the spring.

Picture of a completed & functional protected spring



5.8 Participatory Integrated Natural Resource Management

The project will promote natural resource management by scaling up agro-forestry in all the target communities to improve natural vegetation cover and also facilitate improvement of water shed management. The process will entail conservation of the water sources and also reduce soil erosion in areas that have adequate water sources to enhance protection of water sources. Community will be encouraged to venture into productive natural resource management activities i.e. Tree planting to reduce natural resource degradation. The project will therefore work with target community self-groups to scale up agroforestry initiatives in liaison Kenya Forest Services in the respective project area. All the water points will be focal points for forestry livelihoods through establishment of tree nurseries.

5.9 Livelihoods and food security

The project will promote sustainable livelihoods component to address food security and poverty reduction. The component will be in-built within the water project through vegetable production and horticulture scaling up in target schools. Production of high yielding tissue banana will be carried out in the target villages to improve food production and security. The success of the livelihood components will reduce poverty by enhancing sustainable incomes and food sufficiency at village level.

5.10 Overview of Drip Irrigation Systems

Purpose

Participants to understand the rationale for drip irrigation for increased food production and productive use of water for improved livelihoods

Introduction to drip irrigation systems for productive use of water & improved livelihoods

Drip irrigation can reduce the water requirement by as much as 25 to 50 percent compared to conventional irrigation. The main advantage of drip irrigation is that soil moisture remains relatively constant, and it is always available to the roots. In other watering methods, there is extreme fluctuation in water content, temperature and aeration of the soil. With drip irrigation, the water soaks immediately when the flow is adjusted correctly. There is neither flooding nor run-off, so water is not wasted. All of the water is accessible to the roots as it is applied near the root zone. Watering weed patches, walkways and other areas between plants rows is avoided. Water lost to evaporation is negligible and interference by wind is minimal. Fertilizers can be delivered directly to the plant roots through drip. This results in increased efficiency at low fertilizer rates.

Careful choice of the components means half the battle is won. Therefore, the following points should be taken into account when selecting a drip system.

- a) Ease of installation
- b) Ease of cleaning the emitters
- c) Durability
- d) Types of filters
- e) Possibility of flow control

The life of a drip system can be extended by proper design, proper filtering, avoiding puncture with tillage tools, mulching over plastic lateral drip lines to shield them from sunlight, and flushing and draining line periodically. The financial investment is reasonable small if you are willing to plan, assemble and install the system. Savings in water combined with increased yields and quality of vegetables and flowers more than pays for the cost of parts to maintain a drip system.

The project will install drip irrigation systems to all constructed water points to enhance food production and improved livelihoods for target communities and schools.

5.11 Partnership with relevant County Institutions and other key stakeholders

The project will work in liaison with devolved units which have the mandate to coordinate rural development projects. Therefore, the key county departments involved in the coordination of the various components of the project will be partners in the implementation process.

Therefore, the project will work with the department of forestry, Education, Water and Agriculture to enhance quality interventions and develop community capacity for replications and sustainability.

5.12 Ecological Sanitation and Agroforestry Promotion

Most of the rural population of Africa do not have access to safe and reliable toilets. A good toilet, together with a safe reliable water supply and the practice of good personal hygiene can do much to improve personal and family health and wellbeing. So there is an urgent need for the construction of simple, low cost, affordable toilets that are easy to build and maintain and are relatively free of odours and flies.

Builders and artisans are not required, once the householder has learned the basic methods of construction. To start all that is required is part of a bag of cement (between one eighth (5 litres) and one quarter (10 litres) of a 50 kg bag), and some good river sand and thick wire. With this the householder can build a concrete slab which will last for many years. The slab is mounted on a "ring beam" of bricks or

concrete and a shallow pit is dug down inside the beam. A simple structure for privacy, made from locally available materials, is then built around the slab. Flies and odours are controlled by regularly adding soil, wood ash and leaves into the shallow pit. By adding the soil, ash and leaves, the excreta in the pit turns into compost. It is possible to grow a tree on this compost, which will later form fruit or supply timber for fuel or building. It is also possible to dig out the compost after a suitable time and use this to fertilize the vegetable garden. So the simple toilet can have many valuable uses! This particular toilet is called an Arborloo because a tree is planted on the filled pit. The Arborloo is then moved to a new place. Over the years it is possible to improve on the original toilet using the same concrete slab. It is a small amount to pay for something that gives so much benefit to the family. The Arborloo is the name given to a simple pit toilet. It is easy to construct & is cheap to build. The Arborloo is made up from 4 parts:

1. The **pit**
2. The “**ring beam**” to protect the pit
3. The **concrete slab** which sits on the ring beam
4. The **toilet house** which surrounds the slab.

The **Arborloo** pit fills up with a mix of excreta, soil, wood ash and leaves. Leaves are put in the base of the pit before use and every day some soil and wood ash are added to the pit. Dry leaves are also added to the pit.

No garbage is put down the **Arborloo** pit, when soil, ash and leaves are added to excreta, it changes quite fast into compost. The daily addition of soil and ash also helps to control flies and smells. When the **Arborloo** pit is full, the toilet is moved to another place and a thick layer of soil and leaves is placed over the pit contents. A young tree is planted in this soil and is watered and cared for and also protected against animals. The toilet is used again in the same way in the new **Arborloo** site. The same process takes place again.



Arboloo/SANPLAT latrine under Construction-Slab Mounted on the pit latrine

5.13 Effective Micro-organism(EM) for improved Sanitation for Schools

The project will carry out demonstration in target schools for adaptation of EM technology to improve sanitation for existing latrines. The process will save schools funds for construction of new latrines hence be able to re-use old latrines via application of EM solution. The solution suppresses and degrades the waste clearing all maggots in the latrines and clears foul smell making latrines usable and clean free from flies. The following is the of effect of EM on hygiene and sanitation management &Benefits of EM in agriculture.

EFFECT OF EM ON HYGIENE &SANITATION MANAGEMENT	BENFITS OF EM IN AGRICULTURE
<ol style="list-style-type: none"> 1. Suppress bad odor from toilets, pit latrines, sewage systems & dumpsites etc 2. Inhibits proliferation of harmful vectors such as flies, mosquitoes and cockroaches 3. Unblocks sinks and sewage systems 4. Sterilizes the whole system (toilet bowls and sewerage system) 5. Suppresses harmful germs like E-Coli that causes cholera and Typhoid 6. Acts as deodorizer to fresh toilets and bathrooms 7. Breakdown down the organic waste in septic tanks into water that will drain in the seepage tank 8. Reduces the volume of pit latrines 9. In bathrooms &toilet floors for cleaning as protection from fungus and bacteria 10. Reduces smells and stains in urinals 	<ol style="list-style-type: none"> 1. Promotes germination, growth, flowering, fruiting and ripening in crops 2. Enhances the photo synthetic capacity of plants 3. Increases the efficiency of organic matter as fertilizer 4. Improves the physical, chemical and biological environment of the soil 5. Ferments organic matter as opposed to deterioration hence reducing offensive odor and flies 6. Breaks organic matter rapidly, unlike in normal application where it takes months 7. It facilitates the release of greater quantities of nutrients to plants 8. It destroys harmful insects and pests, but not the beneficial ones 9. Has the capacity to convert waste into useful non-toxic 10. Develops internal immunity of plants and animals thus enhancing natural resistance 11. It retards the process of rusting in metals, reducing the costs of machinery

ACTIVITY 6: STAKEHOLDERS PARTICIPATION IN PROJECT IMPLEMENTATION

KEY STAKEHOLDERS	ROLE MANDATE
1. National Government Agencies & Officers	<ul style="list-style-type: none"> a) Coordinate activities with other stakeholders b) Participate in PRA activities c) Represent the national Government in various activities at community level d) Support project implementation activities e) Coordinate community mobilization of materials for project implementation
2. Kenya Forest Service	<ul style="list-style-type: none"> f) Promote forest conservation by supporting community groups undertake agroforestry and also provision of tree seedlings to enhance vegetation cover. g) Promotion of water conservation activities with communities to ensure the project initiated have improved water conservation h) Can provide mechanized farm patterns for various community group i) Support establishments of forests livelihoods for farmers groups through tree nurseries around water points
3. Kenya Forest Research Institute (KEFRI)	<ul style="list-style-type: none"> a) Undertake research for tree species and also promotes tree species that enhances vegetation cover. The KEFRI will provide community groups with seedlings that will improve water conservation and vegetation cover b) Undertake matching of species for specific areas and spacing of plants for community groups c) Soil testing of various sites for different crops and tree species d) Support establishments of woodlots for schools & interested community members
4. Department of agriculture	<ul style="list-style-type: none"> a) Provide capacity building to farmers group on type of vegetable seeds and also in puts required. b) Participate in the PRA exercise to understand community agricultural needs and other challenges requiring their attention
5. Ministry of Education	<ul style="list-style-type: none"> a) Promote school participation in water projects implementation and also ensure schools undertake vegetable production as part of competency based curriculum b) Provide Support the project to reach target schools to enhance improved water and sanitation development
6. Social Development Groups (Women & youth groups, Farmers group)	<ul style="list-style-type: none"> a) Participate in the PRA process to identify community needs and also participate in project implementation as target groups and beneficiaries. b) Undertake water conservation ,vegetable production ,ecological sanitation and rural livelihoods activities
7. Department of Health – Public health	<ul style="list-style-type: none"> a) Promote and support school hygiene and sanitation component to ensure schools active participation in hygiene and sanitation transformation b) Ensure schools participate actively towards sanitation improvements and development c) Provide relevant IEC Materials required for hygiene and sanitation promotion
8. Department of Livestock/fisheries	<ul style="list-style-type: none"> a) Participate in project activities b) Support capacity building of dairy goat farmers /Fish pond farmers c) Develop designs for dairy goat Stable construction d) Undertake follow ups on dairy goat rearing & feeding e) Support fish pond farmers to ensure improved management of fish ponds

ACTIVITY 7: SELECTION OF PARTICIPATORY RURAL APPRAISAL TEAM

SUBCOUNTY OFFICIALS	WEST BUNYORE WARD
<ol style="list-style-type: none"> 1. Sub county Public Health Officer 2. Sub county Water Officer 3. Sub county Agriculture Officer 4. Sub county Education Officer 5. Sub county Livestock Officer 6. Sub county Fisheries Officer 7. Sub county Social Services 	<ol style="list-style-type: none"> 1.Zablon Aruka 2.Joel Nanjelo 3.Trufosa Anupi 4.Enos Andiba 5.Fredrick Etale
CENTRAL BUNYORE WARD	NORTH EAST BUNYORE WARD
<ol style="list-style-type: none"> 1. Ruth Anindo 2. Zakayo Kwendo 3. David Olocho 4. Rosemary Angondi 5. Ateku Andrew 	<ol style="list-style-type: none"> 1. imaSeth Majani 2. John Imbayi 3. Alice Kusa 4. Simala John 5. Francis Bwana

ACTIVITY 8: ACTION PLANS FOR PROJECT INCEPTION & IMPLEMENTATION

ACTIVITY	WHEN	WHERE	HOW	WHO IS RESPONSIBLE
1. Participatory Rural Appraisal Exercise	22 nd January,2024 to 26 th January ,2024	Emusire	PRA tools &methods	PRA team Project Officer/Consultant
2. Community Mobilization for project implementation	27 th January,2024 to28 th Janaury,2024	All selected project sites	Community participation in materials contribution	Project Officer /Site committees
3. Construction of Water and sanitation facilities	1 st March,2024 to December, 2024	Selected sites that are ready with materials	Material support from project /Contractors engaged	Project Officer
4. Project Review meetings/Forum	Quarterly basis April,2024	Emusire	Transport reimbursement /stationary	KUMEA Project team
5. Training of Dairy Goat farmers on Animal Husbandry	April,2024	Site to be identified	Facilitator/Training materials Transport reimbursement /stationary	Project Officer

ANNEX 1: WORKSHOP PHOTOS



1.0 Programs Coordinator making presenting the overview of the Integrated Rural Development Project



2.0 Plenary presentation and discussions on Project components



3.0 Plenary discussions on issues concerning community participation and their roles in implementation



4.0 Leaders discuss to agree on selection of participants to be involved during the participatory rural appraisal exercise



5.0 Group discussions on scheduling of the PRA activities in the sub county



6.0 Plenary discussions on implementation plans and composition of the Participatory Rural Appraisal team composition

ANNEX 2: TENTATIVE PROGRAM FOR PROJECT ORIENTATION FORUM ON TUESDAY, 16TH JANUARY, 2024, INTERGRATED RURAL DEVELOPMENT PROJECT

TIME	ACTIVITY	PERSON RESPONSIBLE
8.00am-8.30am	Arrival of participants	Prisca Khatebi
8.30am-9.00am	Participatory Introductions & Participants Expectations	Prisca Khatebi
9.00am-10.00am	Overview of KUMEA & Key projects	Program Coordinator - KUMEA
10.00am-10.30am	Break	
10.30am-11.30am	Overview of Western Water Livelihoods & WASH Project Project Components Role of groups /Associations Role of schools	Program Coordinator - KUMEA
11.30am-1.00pm	Role of stakeholders in Project implementation Department of Agriculture Ministry of Education Department of Water Department of Public Health Kenya Forest Service	Departmental Heads/Representative
1.00pm-2.00pm	Lunch Break	
2.00pm-3.00pm	Planning for Implementation & Criteria for project support	Program Coordinator - KUMEA
3.00pm-4.00pm	Action Plans	Program Coordinator - KUMEA
4.00pm-4.30pm	Workshop Evaluation & Closure	All participants