



IMPACT ASSESSMENT FOR EASTERN WATER LIVELIHOODS PROJECT

“Building sustainable livelihoods with communities through water access & natural resource management”

TABLE OF CONTENT

ITEM	PG
1.0 Executive Summary.....	2
2.0 Background of Eastern Water Livelihoods Project.....	3-4
3.0 Project Implementation Performance.....	4-8
4.0 Outcomes of Project Interventions.....	9-10
5.0 Key Project Impacts	10-11
6.0 Project Impacts in relation to Millennium Development Goals.	12
7.0 Project Impacts based on Sustainable Development Goals.....	13
8.0 Other Key Project Impacts	14

Annex 1: Project Photos

List of tables

Table No.	Description	Page No.
<i>Table 3.1.1</i>	<i>Construction of Water points progress in the different Project areas</i>	<i>5</i>
<i>Table 3.1.2</i>	<i>Implementation Progress for Schools in Kibwezi East Sub county</i>	<i>5</i>
<i>Table 3.1.3</i>	<i>Implementation Progress for Schools in Kibwezi West</i>	<i>5</i>
<i>Table 3.1.4</i>	<i>Analysis of Project sites and beneficiary for various village water points (Shallow wells)</i>	<i>6</i>
<i>Table:3.2.2</i>	<i>Agroforestry Promotion in schools for Natural Resource Management</i>	<i>7</i>
<i>Table: 3.2.3</i>	<i>Ecological Sanitation promotion in target villages for Agroforestry promotion</i>	<i>7</i>
<i>Table:3.2.4</i>	<i>Support farmers' groups with Cassava seedlings for food security & sustainable agriculture</i>	<i>7</i>
<i>Table 5.1.1</i>	<i>Community contribution ratio for Water and Sanitation facilities</i>	<i>11</i>
<i>Table 5.1.5</i>	<i>Inventory of Households Kitchen Gardens</i>	<i>12</i>
<i>Table 5.1.7</i>	<i>Cost benefit analysis and value for money aspects for completed water livelihoods projects</i>	<i>12</i>

1.0 EXECUTIVE SUMMARY

The Eastern Water livelihoods project has been under implementation for the last one-year year from January, 2022 and expected to end January 31st 2023 through implementation by Kujenga Miasha East Africa-KUMEA with funding from NAK-Karitiative. The project covered Kibwezi sub county of Makueni County and has been implemented in Kibwezi East and West wards.

The project has worked with 5no. schools and 10no.women groups in the 2 locations/wards. Throughout the implementation process the project has worked with partners and stakeholders i.e. Sub county Agriculture department, Kenya Forest Service and sub county Education office.

The choice of technology for the project's water supply implementation was roof catchment tanks for schools based on Ferro-cement technology and hand dug wells for the communities fitted with solar pumping unit. All the water points have been fitted with drip irrigation to enhance sustainable food production for target villages and also schools. Some project sites have integrated tree nurseries to diversify into forest livelihoods. For sanitation, the technology applied was integrated with agroforestry to provide villages with options of promoting agroforestry after use of latrines through Ecological sanitation concept and technology based on recycling of waste. School sanitation has been basically through Effective Micro-organism for degrading & suppressing the waste and providing schools with ease of maintaining the latrines since the flies, bad odors and worms have been contained.

Adequate Capacity building and the training components of the project included on-site and workshops, follow-ups, demonstrations which have enabled the communities to operate, maintain and manage the installed facilities, collaborate with other stakeholders to facilitate sustainability.

The project has been well supported by other key stakeholders namely KEFRI and Kenya Forest Service in promoting school agroforestry initiatives via woodlots and also support groups to scale up into forestry livelihoods through tree-nurseries.

The purpose of this impact assessment report is therefore to assess the performance of the project against the objectives it set out to achieve.

The Project performed very well in achieving all projects targeted components (100%) which include construction targets, Project appraisal process through participatory Rural Appraisals, Conservation Agriculture and organic farming, Vegetation production orientation and establishing sustainable vegetable production process. There has been improved socio-economic performance from groups selling vegetables and schools enhancing school feeding programs at reduced costs due vegetable production.

In conclusion, the Eastern Water Livelihoods project has achieved its objectives by maximizing respective contributions from all the parties. Water access and livelihoods intervention has been given equal attention hence the replications of households' kitchen gardens which will ensure sustainability in food production. The lessons learnt in this project will be in-built in other similar projects to improve the quality of project implementation and interventions.

2.1 Background of the Project

Eastern Water Livelihoods was initiated in January, 2022 with funding from NAK-Karitativ of Germany after approval of the water livelihoods proposal. The project has been working in 2 sub counties of Makueni County namely Kibwezi East and West Sub counties. The project objective has been to improve access to safe water, improved livelihoods, enhanced food security and improved natural resource management.

2.2 Key project components

a) Sustainable agriculture & forest management

The project promoted sustainable agriculture options to enhance effective land utilization for food production via promotion of conservation agriculture for all target groups involved. The target groups involved through liaison with Kenya Forest Service initiated tree nurseries at water points to enhance afforestation at village level. All the target schools have tree nurseries and Kenya Forest Service together with KEFRI and KUMEA have facilitated the enhancement of woodlots in the 5no. target schools with involvement of school teachers and respective 4K clubs. During project implementation each school planted approximately 300 seedlings for setting up of school woodlots.

b) Promoting water efficiency & low-cost interventions

In each sub county the project worked with women group to construct shallow wells through community participation and also construction of Ferro-cement water tanks of 30,000litres for each school. The water point at the community for the women groups was fitted with solar pumping kit and 5,000litres tank. Water from the wells was pumped to the tank then community could access drinking water from the 5,000litres and part of the water was utilized for drip irrigation via the water tank. The utilization of water for domestic use and irrigation has enhanced effective use of the water point minimizing water wastage and time hence efficiency in water delivery.

c) Promotion of recycling for waste & garbage for food production

The project has trained all the 10no. women groups who have benefited from the water point on organic farming. The use of animal and chicken waste as manure to improve soil quality and hence improved food production. Through ecological sanitation the community members have access to SANPLAT/Arboloo latrines which after filling up households will transfer the superstructure and slabs to new latrine sites and use the filled pits for fruit tree production by planting mango, orange seedlings or banana seedlings to enhance food production

d) Promotion of Renewable energies for Water utilization, irrigation and energy at household

All the 10no. hand dug wells completed have been fitted with solar pumping unit and water is pumped to 5,000litres tank then community access water for domestic use while the drip irrigation installed at the tank provides water for vegetable production. The utilization of solar pumping system reduces the time when spent pumping water at the water points and irrigation of the crops can be administered by one person or can be systematical controlled by the group. Also water collection time can be controlled to ensure balance of water for irrigation and domestic use. Effective water collection and use has empowered women to address other pressing needs while the food production is well managed.

2.3 Final Goal

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

2.4 Intermediate Goals

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

2.5 Key Project Strategies Applied

- a) Utilization of Participatory Rural Appraisal process for project planning and resource mobilization at community level
- b) Promotion of conservation agriculture and organic farming for sustainable food production
- c) Promotion of agroforestry and woodlots to enhance afforestation in target villages and schools
- d) Utilization of drip irrigation for all the water points to enhance food production and water livelihoods
- e) Promote Ecological sanitation for improved sanitation and agroforestry through adaptation of Effective Micro-organism technology for school sanitation and Arboloo /SAN PLAT latrines for agroforestry promotion
- f) Promote role of women in Water and Environmental sanitation through targeting women groups for water point development and sanitation development through SANPLAT slabs
- g) Liaison and working with schools to develop demonstration farms for Competency Based Education and also involvement of 4K Clubs for agroforestry promotion
- h) Partnership with County Institutions i.e. Department of Education ,Agriculture and other stakeholders such as KEFRI and Kenya Forest Service

3.0 THE PROJECT IMPLEMENTATION PERFORMANCE

3.1 THE PROJECT COMPONENTS

The Eastern Water Livelihoods had 4 key project components during implementation. These are: Develop low cost water options for Community, target farmers' groups and Schools, Natural Resource Management and Sustainable Agriculture, Capacity building and Partnership with various stakeholders

3.1.1 DEVELOP LOW COST WATER OPTIONS FOR COMMUNITY, TARGET FARMERS' GROUPS AND SCHOOLS

This component involved construction of Ferro-cement water tanks and hand dug/shallow wells fitted with Solar pumping system. All the water points had drip irrigation installed to enhance food production at village level and respective target schools. Table below provides progress of construction activities;

Table 3.1.1 Construction of Water points progress in the different Project areas

TYPE OF WATER SYSTEM	PROJECT AREA/ SUBCOUNTY	PLANNED	ACHIEVED	UNDER CONSTRUCTION	% ACHIEVED
SHALLOW WELLS	KIBWEZI EAST	5	5	0	100%
	KIBWEZI WEST	5	5	0	100%
	TOTALS	10	10	0	100%
FERRO-CEMENT WATER TANKS	KIBWEZI EAST	4	4	0	100%
	KIBWEZI WEST	1	1	0	100%
	TOTALS	15	15		100%
	OVERALL TOTALS & RATING	100%			

Table 3.1.2 Implementation Progress for Schools in Kibwezi East Sub county

NAME OF SCHOOL	NO. OF FERRO-CEMENT TANKS (30,000 Litres each) CONSTRUCTED	SIZE OF LAND UNDER HORTICULTURE VIA DRIP IRRIGATION	TYPE OF VEGETABLE PRODUCED	POPULATION			
				BOYS	GIRLS	TEACHERS	TOTALS
1. Yikivumbu Primary school	1No.	896 M ²	Kales &Cabbages	212	173	13	398
2. Ndauni Primary school	1No.	1092 M ²	Kales &Cabbages	168	160	13	341
3. Kyumani Primary School	1No.	837 M ²	Kales &Cabbages	215	172	9	396
4. Miamba Primary school	1No.	972 M ²	Kales &Cabbages	78	72	11	161
Totals	4No.	3,797M²		673	577	46	1,296

Table 3.1.3 Implementation Progress for Schools in Kibwezi West

NAME OF SCHOOL	NO. OF FERRO-CEMENT TANKS (20,000 Litres) CONSTRUCTED	SIZE OF LAND UNDER HORTICULTURE VIA DRIP IRRIGATION	TYPE OF VEGETABLE PRODUCED	POPULATION			
				BOYS	GIRLS	TEACHERS	TOTALS
1. Katulani Primary school	1No.	780M ²	Kales &Cabbages	130	135	15	281
Totals	1No.	780 M²		130	135	15	281

Table: 3.1.4 Analysis of Project sites and beneficiary for various village water points (Shallow wells)

PROJECT AREA	SITES/VILLAGES	NO.OF HOUSEHOLDS	NO. OF PEOPLE SERVED	STATUS OF THE WATERPOINT	SIZE OF HORTICULTURE LAND	TYPES OF VEGETABLE PRODUCED
KIBWEZI EAST	1. Miamba Mitamboni	60	600	Completed and installed with solar pumping unit &drip irrigation	700M ²	Kales Cabbage Nightshade
	2. Kikwasuni	50	500	Completed and installed with solar pumping unit &drip irrigation	567M ²	Kales Spinach Spiderplant Amaranthus Tomatoes Egg plants Pumpkin
	3. Kyeni Cha Ngini	60	600	Completed and installed with solar pumping unit &drip irrigation	1485M ²	Kales Spinach Spiderplant Nightshade Tomatoes Egg plants Maize
	4. Wasye Umwe	40	400	Completed and installed with solar pumping unit &drip irrigation	968M ²	Kales Cabbage Tomatoes Spinach
	5. Kasunduni	50	500	Completed and installed with solar pumping unit &drip irrigation	760M ²	Kales Cabbage Tomatoes Spinach Amaranthus
	Totals	260	2600		4,480M²	
KIBWEZI WEST	1. Neema ya Mungu	60	600	Completed and installed with solar pumping unit &drip irrigation	650M ²	Kales Cabbage Tomatoes Spinach Amaranthus Nightshade
	2. Ngwataniao Ya Misuuni	50	500	Completed and installed with solar pumping unit &drip irrigation	832M ²	Kales Spinach Nightshade
	3. Wise women	60	600	Completed and installed with solar pumping unit &drip irrigation	1632 M ²	Kales Spiderplant Spinach Nightshade
	4. Wikwatyo Mbaitu	50	500	Completed and installed with solar pumping unit &drip irrigation	1152 M ²	Kales Cabbage Tomatoes Spinach Nightshade Okra Onions
	5. Syokoa	50	500	Completed and installed with solar pumping unit &drip irrigation	825M ²	Kales Tomatoes Spinach Okra
	Totals	270	2700		5,091M²	
GROSS TOTALS	10No.	530	5,300		9,571M²	

3.2.1 NATURAL RESOURCE MANAGEMENT AND SUSTAINABLE AGRICULTURE

The project worked with various stake holders to improve natural resource management and enhance sustainable agriculture

Table:3.2.2 Agroforestry Promotion in schools for Natural Resource Management

Project area	Type of Activity	Schools involved	No. of seedling/trees planted
Kibwezi East	Afforestation and creation of woodlots	1. Yikivumbu primary school	300 Assorted seedlings
		2. Ndauni Primary school	300 Assorted seedlings
		3. Kyumani Primary School	300 Assorted seedlings
		4. Miamba Primary school	300 Assorted seedlings
		Sub-total	1200
Kibwezi West		1. Katulani Primary school	300 Assorted seedlings
		Sub-total	300
		Total	1500 Assorted seedlings

Table: 3.2.3 Ecological Sanitation promotion in target villages for Agroforestry promotion

Type of activity	Project Area	Group/village	No. of households involved
Orientation on Ecological Sanitation process & Casting /manufacture of SANPLAT/Arboloo slabs for Ecological Sanitation & Agroforestry	Kibwezi East	Miamba Mitamboni/Uvilio village	30
		Ngwatanio Ya Ndiwa /Kyeni Cha Ngini-Ngini village	24
		Subtotal	54
	Kibwezi West	Neema Ya Mungu-Katulani village	30
		Ngwatanio Ya Misuuni-Misuuni village	30
		Subtotal	60
			Total

Table:3.2.4 Support farmers' groups with Cassava seedlings for food security & sustainable agriculture

Type of Activity	Project Area	Group/village	No. of cassava seedlings provided for households cassava production
Provisions for Cassava seedlings to groups for food security & food production	Kibwezi East	Miamba Mitamboni-Uvilio village	600
		Ngwatanio Ya Ndiwa-Mitamboni village	600
		Uvilio women-Miamba village	600
		Wasya Umwe-Ngini village	600
		Sauti Women-Kivutini village	600
		Sub-total	3000
	Kibwezi West	Neema ya Mungu-Katulani village	600
		Ngwatanio Ya Misuuni-Misuuni village	600
		Wise women-Nyekindune village	600
		Wikwatyo –Matua Village	600
		Syakoya –Koya village	600
	Sub-total	3000	
		Total	6000

3.3.0 CAPACITY BUILDING AND PARTNERSHIP WITH VARIOUS STAKEHOLDERS

The project carried out various capacity building sessions and process with involvement of key stakeholders & partners. The following are the list of capacity building process carried out during implementation;

Type Of Activity	No. Planned	Actual No. Conducted	No. of Participants involved			Key outcomes	Rate of implementation
			Male	Female	Totals		
1. Leaders Orientation forum	1	1	21	21	42	Project Introduction, Stakeholders identification & analysis Terms of engagement	100%
2. Participatory Rural Appraisal	2	2	95	115	210	Village sites identification, Community Resource Mobilization & Management plan development, Farmers group identification & stakeholders participation	100%
3. Conservation Agriculture & Organic farming	1	1	11	39	50	Promote sustainable & organic farming Improve community food production Promote natural resource management & reduce soil erosion	100%
4. On-site Vegetable production & agroforestry promotion for target schools & villages	1	1	75	75	150	Orientation on drip irrigation installation, Seedlings development for vegetable production and pests/weed management	100%
5. On-site Orientation on Effective Micro-organism application for target schools	5 schools	5 schools	803	702	1505	Effective Micro-organism for school sanitation improvement & promote natural resource & waste management	100%
6. Water Resource Management Training	1	1	18	32	50	Develop capacity for sustainability and effective use of water points Promote productive use of water & sustainable livelihoods	100%
7. Quarterly review meetings	8	8	52	112	164	Participatory Project review Project monitoring & stakeholders/partners participation	100%
7No. Different trainings & activities			1,075	1096	2,171		

4.0.0 OUTCOMES OF THE PROJECT INTERVENTIONS

4.0.1 Participatory Rural Appraisal

The Participatory Appraisal Process empowered the community to identify water point sites based on the various women groups affiliations. The identification proved to be positive impact towards community resource mobilization due to working with groups that are already organized and willing to participate actively towards project implementation. The process enabled the community to fully participate in project implementation and reduce conflict of interests during project implementation

4.0.2 School Access to safe water supply and drip irrigation for food production

The participation of schools towards construction of the Ferro-cement water tanks has generated additional benefits for schools with the installation of drip irrigation kit. The irrigation kits provide adequate opportunity for enhancing schools food security especially provision of meals for children thus reducing costs for parents. The drip irrigation provides demonstration farm for learners to appreciate agriculture lessons and support the current education system of Competency Based Education Curriculum(CBC). The adaptation of the agriculture lessons can easily be replicated by students to their homes once the undertake practical lessons in school.

The agriculture teaching staff have secured the relevant tools for facilitating their agriculture lessons hence provide adequate learning to the students/pupils in the target schools.

Schools can connect their water tanks to existing water lines which may not be reliable but once the water is filled in the tanks and there is disruptions of the water supply the schools will continue to meet their water needs due to adequate water storage. The water tanks provide schools with access to safe water and also for other needs. Drip irrigation uses minimum water unlike other form of irrigation.

4.0.3 Effective Application of Effective Micro-organism Solution (EM) to improve School hygiene and sanitation

Hygiene and sanitation promotion in schools through methods of active learning such as songs, poems and skits have enhanced behavior change and effective use of water and sanitation facilities in schools. Some schools have adapted the process to enhance peer learning to improve academic performance. The project initiated the school hygiene and sanitation promotion to enhance effective use of water and sanitation facilities in schools. All the target schools had their teachers oriented on the Ecological sanitation process to enhance disease prevention among school children at home and at school levels. All the target schools received water Effective Micro-organism (EM) kits to improve school sanitation and promote hygiene. The EM solution is able to degrade the waste in the latrines, reduce smell and eradicate flies and worms that are common in poorly maintained latrines. The use of Effective Micro-organism solution has saved the schools funds of digging new latrines since the can apply the solution on the filled up pit latrines to suppress the waste and use them effectively.

4.0.4 Training and Capacity building sessions

This focused mainly on the key trainings for Community resource persons at village level and schools for implementation and sustainability of project components

- a) Participatory Rural Appraisal process for enhanced community planning and resource mobilization
- b) Conservation and organic farming Methods-Effective minimum tillage &use organic fertilizer for improved sustainable food production

- c) Vegetable production and agroforestry has enabled most group members replicate vegetable production by having their own kitchen gardens in their homes so that they are self-sufficient towards food production.
- d) Water resource management training has enhanced communities and groups capacity to appreciate productive use of water and sustainable livelihoods.

5.0.0 KEY PROJECT IMPACTS

5.1.0 Community Contributions and participation

Community contribution and participation has been an important component in the implementation of the project. Community contributed local materials and unskilled labour during project implementation. The active participation enabled the project to achieve the desired objectives and even the physical development of facilities. The higher achievements in physical development are attributed to active community participation and contribution which enhances project sustainability and replication. The concept of community participation and contribution was built in project implementation process.

Table 5.1.1: Community contribution ratio for Water and Sanitation facilities

Type of water and sanitation facilities	% Community/school contribution	% Project Support by KUMEA through NAK Funding
1. Shallow Wells	30%	70%
2. School water Tanks for 30m ³	40%	60%
3. Households Sanitation-San plats	70%	30%

The implementation of the above projects has been successful and cost effective due to the flexibility of using various local available materials for construction of tanks i.e. Rough stones, sand and use of mud/wattle in case of Sanplat/Arboloo latrines for agroforestry promotion

5.1.2 Ferro-cement Water Tanks Construction& fitted with drip irrigation kits

The project adapted a standard design of tanks of 30 m³ (30,000litres) each irrespective of the roof size. The use of local available materials i.e. hardcore, sand and props promotes the replication of water tanks. All water tanks have been fitted with drip irrigation systems to improve food production in schools and also utilize demonstration farms for school agriculture promotion & learning for students. The 5no. school water tanks constructed are serving cumulative population of 1,577 people (pupils & teachers) and providing water for 4,577 M² Land under irrigation for the 5no. schools.

5.1.3 Hand dug/ Shallow wells Construction& fitted with drip irrigation

All the completed shallow wells have been fitted with Solar pumping units with storage tanks of 5,000litres and have been sited in water occurrence sites. The wells are functional and in good condition. They are serving households by providing adequate water for drinking, other domestic use and irrigation. The hand dug wells have been lined with culvert rings due to unstable soil formation. Community participated in digging of the wells up to the water level and assisting the artisans in construction of the wells. Each water point committee/group provided adequate land for drip irrigation. The drip irrigation provides groups with opportunity to utilize the water for food production i.e. vegetable production. Land owners have signed land easement agreement letters to allow community members use the water point without any interruptions. The project has constructed 10no. hand dug wells fitted with solar pumping unit and drip irrigation serving 530 households/families approximately 5,300 people with 9,571M² Land under irrigation for sustainable livelihoods.

5.1.4 Increased Adaptation for Household Kitchen gardens

Due to the increased promotion for vegetable production. Most households have adapted the kitchen garden concept to improve sustainable food production especially for the target groups involved in project activities. In liaison with sub county agriculture department several farmers have received kits for kitchen garden promotion. The following table provides data on kitchen gardens initiatives

Table 5.1.5 Inventory of Households Kitchen Gardens

Project Area	Group/village	No. Kitchen Garden
Kibwezi East	Kikwasuni	8no.
	Wasya Umwe	10no.
	Kasunduni	5no.
	Kyeni Cha Ngini	7no.
	Miamba Mitamboni	13no.
	Sub-total	43No.
Kibwezi West	Neema Ya Mungu	12no.
	Syokoya	9no.
	Ngwatano ya Misuuni	10no.
	Wikyatyo	12no.
	Wise Women	6no.
	Sub-total	49No
Totals		92No.

5.1.6 San-plat/Ecological sanitation latrines Construction

The project is promoting household sanitation based on San plat/Ecological sanitation technology. The implementation of the household sanitation has been encouraging and has been adapted due to its linkages with agroforestry. When the latrines or pits are filled the slab is transferred to another site and fruit tree seedling are planted at the old site to utilize the waste for growth. Interested households from identified villages are trained on slab manufacture and construction. The project was piloting the concept in 2no. villages in each sub county. 54no. Households have constructed Sanplat/Arboloo latrines in Kibwezi East and are currently in use while 60no. households have constructed the same latrines in Kibwezi West. A total of 114no. of Sanplat/Arboloo latrines are in use hence effective use of latrines for agroforestry promotion.

Table 5.1.7 Cost benefit analysis and value for money aspects for completed water livelihoods projects

Type of water & sanitation system	Cost per unit (Project support costs)	No. of completed facilities	Total expenditures (direct project support costs)	No. of beneficiaries	Cost per unit/beneficiary
1. Shallow wells fitted with Solar Pumping unit & drip irrigation system	466,000	10No.	4,660,000	5,300	Kshs. 879per beneficiary
2. Ferro-cement Water tanks fitted with drip irrigation system	243,400	5No.	1,217,000	1,577	Kshs.772per beneficiary
3. San plat latrines	1200	114No.	136,800	1140	Kshs.120 per beneficiary
		129	6,013,800	8,017	Kshs.750 per beneficiary

5.1.7 Impacts of the various water facilities and drip irrigation

The community contribution and participation at project level has been encouraging and therefore contributed to achievement of the project targets on physical development of water points and installation of drip irrigation systems. The hand dug wells completed in the project areas have provided community members with access to safe water for domestic use and livelihoods opportunities via vegetable production and tree nurseries development. Schools have been able to access safe water from the completed tanks hence reduction in time for fetching for school children and the initiation of school feeding programs in schools' due vegetable production via drip irrigation. Also reduction in water related diseases in schools and high enrolment of school children.

Due to improved sanitation via Effective Micro-organism technology girl child enrolment has improved and also improved academic performance due to reduction in absenteeism.

Some schools approached project staff and community resource persons requesting for assistance to have similar project implemented in their schools. The water points are frequently receiving visitors from county Government who are keen to learn the technologies being used to improve food production in arid and semi-arid areas. Due to the availability of water in schools (Kenya Forest Research Institute(KEFRI) and Kenya Forest Services teamed with KUMEA to assist the schools with agroforest seedling with view of creating woodlot for each of the target schools. 1,500 seedlings have been planted in the 5no. schools each school receiving 300 seedlings.

Kenya Forest Service and KEFRI are now registering the water points groups with view of scaling up agroforestry initiatives at each water point via establishment of tree nurseries to create forest livelihoods in the target villages to broaden the community livelihoods base.

5.1.8 Appropriate Technology

The use of solar pumping system for shallow wells has reduced the burden of lining or queueing for water at the various water point sites. The water is pumped as early as 7.00am as long there is sun hence pump water to the storage tanks of 5,000 litres capacity. The water is adequate for domestic use by the community and for drip irrigation for food production. Due to this system the groups have expanded their gardens to include other crops i.e. banana and Okra.

Construction of Ferro-cement tanks in schools and fitting them with drip irrigation has also provided opportunities for schools to access safe water and food production. Construction of the Ferro-cement water tanks mostly uses sand which widely available in the project area hence easy for schools and community replicate the technologies. Appropriate technologies have been adapted for most of roof catchments for schools' water projects. Community members develop sense of ownership during the construction due to their involvement in providing labor and local materials. Ferro-cement water tank technology has been adapted easily due affordability and use of local materials.

The project has developed operation and maintenance manuals to facilitate community to construct, enhance effective use and sustainability of the water Points-Ferro-cement water tanks and hand dug wells.

San-plat sanitation technology has been adapted by communities to enhance sanitation coverage. The project has done well to introduce the technology at village level for household sanitation. Eventual community replication will be achieved with time in the neighboring villages.

The use of effective Micro-organism Solution for schools' sanitation improvement has reduced the cost demolishing pit latrines when filled up. The Effective Micro-organism solution dissolves the waste in the latrines and ensures latrines are clean free from flies, smell and worms. Schools have saved funds since EM application clears and dissolves the waste.

5.1.9 Networking and Collaboration with stakeholders & partners

Good working relationship has been noted with the various institutions at county levels hence providing adequate support in key technical aspects during implementation. The agriculture department at sub county level has been proving capacity through their staff and trained community resource persons to scale up adaptation of households' kitchen gardens and application of conservation agriculture and organic farming.

Kenya Forest Service and Kenya Forest Research Institute has been instrumental in support the project to enhance environmental cover and support schools undertake environmental conservation especially provision of woodlot for the target schools. They have instrumental in supporting the community with adequate information to promote agroforestry in the target villages. The promotion of forest livelihoods at the water points will diversify communities' livelihoods base and incomes.

6.0.0 PROJECT IMPACTS IN RELATION TO MILLENNIUM DEVELOPMENT GOALS(MDG'S)

6.1.1 The Millennium Development Goal 7: Ensure environmental sustainability –Target 10 of the MDG 7:

Halve by 2015 the proportion of people without sustainable access to safe drinking water and sanitation (Improved water supply includes the following; Household connection, public stand pipes, boreholes, protected dug wells, protected springs and rain water harvesting/collection)-Improved sanitation includes the following; connection to sewer, connection to septic tank, pour flush latrines, simple latrines-san plats and ventilated improved pit latrines (VIP)

6.1.2 The incidence of water-related diseases is directly relevant for improvements in the health situation (MDG 4: Reduce child mortality, MDG 5 Improve maternal health and MDG 6: Combat HIV, AIDS, malaria and other diseases) and has an impact on school attendance (reduced time and health constraints for attendance due to improved water supply and sanitation services).

6.1.3 The time saving potential of improved services for women and children (both directly in terms of reduced transport time and costs, and indirectly in terms of time for caring for sick family members) can contribute not only to the education goal (MDG 2) but also to improving chances for participation in development by engaging in income-earning activities (MDG 1).

6.1.4 The provision of adequate water and sanitation services furthermore has positive impact on the general health and nutritional situation. Research studies show that frequent and severe cases of diarrhea have negative impacts on nutrition and that home produced food—such as vegetables, eggs, milk and meat—is related to the availability of land and water.

7.0.0 PROJECT IMPACTS BASED ON SUSTAINABLE DEVELOPMENT GOALS

7.1.0 Sustainable Development Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.

The project provision of food production via drip irrigation address the sustainable development goal 2. The 15no. water points constructed will address these challenge adequately.

7.1.1 Sustainable Development Goal 7: Ensure access to affordable, reliable, sustainable and modern energy

The project utilization of solar pumping system is based on affordable, reliable and sustainable energy application for enhancing water access. Through development of operation and maintenance manuals community will carry out preventive maintenance to ensure effective use of the water point facilities

8.1.0 OTHER KEY PROJECT IMPACTS

8.1.0 The community in the project areas reported saving time for fetching water hence able to undertake livelihood economic activities and also able to save funds due to use of household kitchen gardens.

8.1.1 **The Dublin Principles emphasizes on the need to involve women in water management as follows: Principle No. 3 - Women play a central part in the provision, management and safeguarding of water** “This pivotal role of women as providers and users of water and guardians of the living environment has seldom been reflected in institutional arrangements for the development and management of water resources. Acceptance and implementation of this principle requires positive policies to address women’s specific needs and to equip and empower women to participate at all levels in water resources program, including decision-making and implementation, in ways defined by them.

8.1.2 **The project has promoted the role of women in water access and livelihoods through participation in project initiating, development and management.** The women groups are now scaling up to undertake forest livelihoods as they broaden their livelihoods options. All the 10no. water points are led by women groups and have shown resilience in effective implementation of project activities.

ANNEX 1: PROJECT PHOTOS



1.0 Preparing cassava seedlings & cuttings for planting to improve household food security



2.0 Group members being trained on land preparation for planting of cassava seedlings & cuttings



3.0 Group discussions during the project quarterly review meeting for Kibwezi East Ward



4.0 Ferro-cement Water & Drip irrigation system providing water for the school agriculture demonstration farm



5.0 Kikwasuni water point with drip irrigation system and tree-Nuseries production site



6.0 Kyeni Chan Ngini water point with solar pumping system and drip irrigation farm



7.0 Sykoka water point with solar pumping system and raised storage tank-drip irrigation at edge of the water point



8.0 Neema ya Mungu water point in Katulani village –Group member checking on their vegetable production farm



9.0 Women collecting water from Wise women-Nyekindune village water point site as they check on their vegetable production farm



10.0 Miamba primary school drip irrigation farm being developed