

KUJENGA MAISHA EAST AFRICA-KUMEA



EASTERN WATER LIVELIHOODS PROJECT

Report for Conservation Agriculture orientation training for farmers groups in Kibwezi Sub-county, Makueni County

“Promoting sustainable farming for improved food production”

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1.0 EXECUTIVE SUMMARY

Kujenga maisha East Africa (KUMEA) embarked on training farmers group in Kibwezi East and West sub counties on conservation agriculture with view of adapting the concept to facilitate sustainable agriculture production and to enhance food production to improve community livelihoods.

Training took place in Kibwezi East & West at Misuuni and Ngiini village respectively as from 18th October, 2022 to 21st October, 2022. Participant were drawn from 10 farmers groups-Kyeni cha ngiini, Wasya Umwe, Sauti women, Miamba Mitamboni and Kiwasuni women & farmers groups from Kibwezi East. Ngwatanio Ya Misuuni, Wise women, Neema ya Mungu, Syokoa and Wikwatyo women & farmers groups from Kibwezi West. The training involved a total of 50 participants (11 men and 39 women) drawn from the 10 respective groups. Group members were trained on-site on conservation Agriculture techniques with the appropriate tools. Use of Hand held hoe, Sub soilers, Rippers, Shallow weeders, Jab planter and animal drawn planters. The hands-on training provide farmers group with adequate skills and capacities to implement conservation agriculture to enhance food production. The following are key objectives of this noble training

- a) Improve community resource persons with skills for conservation agriculture and food production*
- b) Improve community food production via conservation agriculture*
- c) Promote natural resource management and reduce soil erosion*
- d) Promote sustainable and organic farming practices*

The rationale of the training is embedded on agriculture production and natural resource management hence conservation agriculture. Conservation agriculture is based on the interrelated principles of minimal mechanical soil disturbance, permanent soil cover with living or dead plant material, and crop diversification through rotation or intercropping. It helps farmers to maintain and boost yields and increase profits, while reversing land degradation, protecting the environment and responding to growing challenges of climate change.

To reduce soil disturbance, farmers practice zero-tillage farming, which allows direct planting without plowing or preparing the soil. The farmer seeds directly through surface residues of the previous crop.

Zero tillage is combined with intercropping and crop rotation, which means either growing two or more crops at the same time on the same piece of land, or growing two different crops on the same land in a sequential manner. These are also core principles of sustainable intensification.

Sustainable intensification is a process to increase agriculture yields without adverse impacts on the environment, considering the whole ecosystem. It aims for the same goals as conservation agriculture. Conservation agriculture practices lead to or enable sustainable intensification.

Towards the end of the training, the farmers have adapted the conservation agriculture principles and methods to enhance food production. They developed capacities for replication to other community members and improve sustainable food production at village level.

ACTIVITY 1.0: RATIONALE FOR CONSERVATION AGRICULTURE

The use of improved technologies such as conservation agriculture may be in place as farmers seek to achieve gains in the face of harsh climatic conditions (Hove and Twomlow, 2006). Conventional agriculture, which often involves intensive tillage, has been claimed to cause soil degradation, particularly when practiced in areas of marginal productivity. In conventional agriculture, soil tillage is considered one of the most important operations to create a favorable soil structure, prepare a seed bed and control weeds. However, mechanical implements destroy the soil structure by reducing the aggregate size. Currently, conventional tillage methods are a major cause of soil loss and desertification in many developing countries. Tillage induced erosion in developing countries can entail soil losses exceeding 150 t/ha annually and soil erosion, accelerated by wind and water is responsible for 40% of land degradation worldwide.

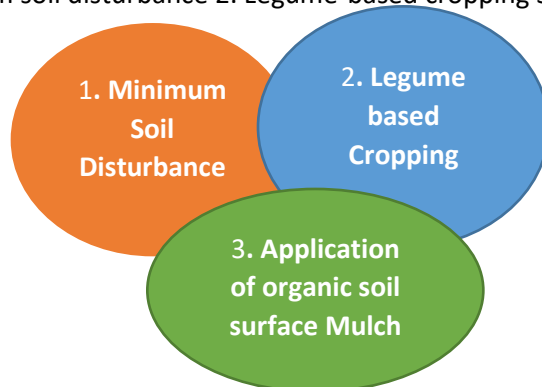
It is from this background that agricultural stakeholders started advocating the use of conservation agriculture practices by smallholder farmers. The goal is to maintain and improve yields and resilience against drought and other hazards while at the same time stimulating biological functioning of the soil practices such as direct sowing, zero-tillage or minimum tillage, and the establishment of cover crops help to protect organic matter and soil fertility. It offers a set of sustainable agronomic practices for smallholder farmers using either the hand hoe or animal draft tillage (ripper). The Conservation Agriculture package includes dry season land preparation, precision input application and nitrogen fixing crop rotations and crop residue retention. These practices aim to improve the soil structure, water retention and reduce the need for chemical fertilizers while at the same time improving crop yield. By breaking through pre-existing hard/plough pans, Conservation Agriculture improves water infiltration and root development; Conservation Agriculture basins and ripper lines harvest water in years of sporadic rainfall.

ACTIVITY 2.0: DEFINITION AND PRINCIPLES OF CONSERVATION AGRICULTURE

It is a way of farming that conserves, improves and makes more efficient use of natural resources through integrated management of available resources combined with external inputs. It contributes to environmental conservation as well as to enhanced and sustained agricultural production. It can also be referred to as resource efficient agriculture.

Three principles and pillars of Conservation Agriculture

1. Minimum soil disturbance
2. Legume-based cropping
3. Application of organic soil surface mulch



Conservation Agriculture consists of three principles (i) minimum soil disturbance, (ii) legume-based cropping and (iii) application of organic soil surface mulch (Baudeau et al., 2007). This improves infiltration, reduces evaporation and soil erosion, and ultimately builds up soil organic matter. Conservation Agriculture also eliminates labor-intensive soil tillage, reducing the labour required for crop production by more than 50 per cent for small-scale farmers. This is especially important for poor households, where children or the elderly have responsibility for farm labour. The planting basin technology has been promoted in some countries such as Zimbabwe as a conservation agriculture option for vulnerable households with poor or no access to animal draft power and involves making a hand hoe basin of 15cm (depth) x 15cm (width) x 15cm (length) in terms of dimensions (Hove and Twomlow, 2008). This basin technology emphasizes the water capture benefits of basins, but at the cost of significant soil disturbance and labour investment. The basin technique also encourages controlled plot densities and precise placement of fertilizer and farmers are encouraged a 90cm row x 60cm plant spacing, giving target plant populations of 3.7 plants per square metre (m²) (Hove and Twomlow, 2008). Conservation Agriculture also involves animal powered tillage systems, mainly ripping or opening up planting lines without overturning all the soil in the field.

ACTIVITY 3.0: KEY CONCEPTS OF CONSERVATION AGRICULTURE

Key issue	Rationale
1. Reduced tillage	Conservation Agriculture eliminates ploughing which is one of the biggest tasks on a farmer's calendar.
2. Reduces weed pressure	Over time, the use of ground cover (mulch), cover crops, and herbicides controls weeds better than traditional methods hence saving time on weeding, another of the most time-consuming tasks in farming.
3. Low-labor implements	For example for those farmers with access to draft power, using the ripper is faster and less laborious than planting using conventional tillage. Some ripper planters can plant and apply fertilizer at the same time.
4. Crop diversity	Growing intercrops and rotating crops allow farmers to diversify their crops and produce a nutritious range of food on the same plot. Many of the intercrops and cover crops used in conservation agriculture are high in protein and vitamins

ACTIVITY 4.0: THE KEY PRINCIPLES OF CONSERVATION AGRICULTURE IMPLEMENTATION

Conservation Agriculture takes advantage of natural ecological processes to conserve moisture, enhance soil fertility, and improve soil structure, and to reduce soil erosion and the presence of diseases and pests. It does this in four main ways – through minimal soil disturbance, the retention of crop residues, crop rotation and integrated management. Below is a detailed explanation of each and what is achieved through each practice.

4.1 Minimum Soil Disturbance

The idea is to disturb the soils as little as possible. This is achieved by preparation of permanent planting basins of 15cm long 15 cm wide and 15cm deep at 90* 60cm spacing or rips lines at 90*30cm spacing and 15cm depth. This ensures minimum destruction of the soil structure, no soil exposure or loosening, slower mineralization of organic matter and little disruption of soil life. The planting basins and rip lines are permanent as the farmer returns to these in subsequent seasons. Rip lines opened at 90* 30 cm spacing. The space between the rip lines is not disturbed

4.2 Keep the Soil Covered as Much as Possible

Soil cover helps in reduction of direct raindrop impact thus reducing soil erosion, reduction in evaporation, suppression of weed growth and provides a buffering effect by protecting against extreme temperature. It is also an effective way of organic matter (OM) and nutrient replenishment. The high moisture retention by residues provides an opportune environment for development of micro fauna and flora communities

4.3 Mix and Rotate Crops

Instead of planting a single crop of maize, farmers should plant several crops in rotation or as intercrops. It is important to include a rotation with legumes. Rotation with legumes is essential in maintaining and improving soil fertility and exploration of different soil layers by different crop species helps prevent formation of a hard pan. Rotation also helps in pest and disease control by breaking life cycles. Nutrient losses are minimized by the use of deep rooting cover crops that recycle nutrients leached from the topsoil. There is optimum plant nutrient use by synergy between different crop types and by alternating shallow-rooting crops with deep rooting ones. Mixing with cover crops provides cover and thus reduces soil erosion and a nutrient balance is reached where legumes fix nitrogen for use by cereals.

In general, the techniques of reducing tillage, increasing surface cover and use of cereal/legume rotations makes farming enterprises resemble soil processes under natural woodlands. Ensure timeliness of operations, which include timely land preparation, timely planting and weeding, effective pest and disease control

ACTIVITY 5.0: THE CONSERVATION AGRICULTURE CALENDAR

There is need to produce a calendar of Conservation Agriculture activities to be used by farmers. The calendar forms a cycle in the Conservation Agriculture operations in the field. It guides farmers on when to do their operations from basin preparation to winter weeding. Below is a summary of activities and the timing in a Conservation Agriculture plot.

Activity calendar	Key Issues/work to be addressed
5.1 Basin Preparation and Ripping: in the dry season- July to August	<ul style="list-style-type: none"> ▪ Use a tape measure to mark out your row spacing of 90 cm and put pegs ▪ Using a planting line mark out positions for basins at 60cm in-row spacing. These are already marked by knots or bottle caps in your string ▪ Take a hand hoe and prepare basins of 15cm width, 15cm depth (as deep as your hand) and 15 cm length. Make sure you break the hard pan. ▪ Basins should be prepared across the slope to ensure they capture water
5.2 Basal Fertilizer Application- September to October	<ul style="list-style-type: none"> ▪ Compound D fertilizer is placed in each basin using 1 level bottle cap per basin ▪ Basal fertilizer should be covered with fine soil, large bits are avoided ▪ Basal application when using a ripper is done by applying a cap on the rip line covering a distance of 30cm
5.3 Manure Application- September to October	<ul style="list-style-type: none"> ▪ Manure /compost should be applied using 1 or 2 handfuls per basin ▪ Manure should be covered with fine soil, large bits should be avoided. ▪ Manure and basal fertilizer can be applied together if all are available ▪ If the farmer is using the ripper tine, manure is applied at a handful for a distance of 30cm on the rip line.
5.4 Planting- November to December	<ul style="list-style-type: none"> ▪ Planting is done after the first effective rains, when the basin or rip line has filled with water and drained. Plant at the correct depth for your crop as this helps the seeds to germinate and emerge evenly ▪ Place 3 pips in one basin (maize) for hand hoe farmers and thin to 2 and for ripper farmers the following should be done <ul style="list-style-type: none"> ➢ Maize: plant 2 pips per planting station and thin to 1 plants per station ➢ Sorghum: plant 4-5 pips per planting station and thin to 1 plant per station ➢ Pearl millet: plant 4-5 pips per planting station and thin to 1 plant per station ▪ Planting is done after rainwater has collected in basin
5.5 Top Dressing Application- January to February	<ul style="list-style-type: none"> ▪ A bottle cap is filled with fertilizer. ▪ One level bottle cap of fertilizer is applied per basin ▪ In a ripper one bottle cap per two three plants ▪ Top dressing should be done on a weed free plot. Farmers are encouraged to start weeding as soon as the weeds appear. This is to ensure that weeds are destroyed before they start seeding and in that way the seed bank is destroyed.
5.6 Harvest- March to July	<ul style="list-style-type: none"> ▪ The farmer removes cobs and leaves the stalks standing in the field. ▪ Stalks are then cut at the base and spread between the rows ▪ Stalks are spread in the field after harvesting
5.7 Management in the Dry Season- June to September	<ul style="list-style-type: none"> ▪ Weeding is encouraged at this time. The farmer prepares basins and rip lines in the same positions as last season and the process starts all over again ▪ Weeding in the dry season is encouraged as it ensures a weed free basin plot at planting

ACTIVITY 6.0: CONSERVATION AGRICULTURE OPTIONS

These can be hand-powered tillage or animal powered options. The hand-powered options include the hand hoe and the jab planter and animal- powered options include use of the ripper tine or the knife roller.

Conservation Agriculture Options	Key activities to be undertaken
<p>1. Hand-hoe</p>	<ul style="list-style-type: none"> ▪ This is an option for farmers who do not have draft animals but can also be used by farmers with draft power when their animals are not in good condition. Basins are prepared only where the crop is to be planted. ▪ Planting basins are prepared in July-August as per Conservation Agriculture calendar with dimensions of 15cm wide, 15cm deep and 15 cm long. ▪ These are prepared at 90*60 cm spacing and they should be prepared in the same positions every year. ▪ Basins should be aligned along the contour ▪ Available soil fertility amendments are then added to each basin and lightly covered with soil. ▪ Planting follows after rainwater has collected in the basin. All other operations follow the Conservation Calendar
<p>2. Advantages of Basins</p>	<ul style="list-style-type: none"> ▪ Land preparation is done before the rainy season, so farmers can plant early Basins preparation breaks through plough pans and provide good rooting conditions ▪ Allows for an even and controlled plant population ▪ Seeds, manure and mineral fertilizer can be correctly placed and thus used effectively.
<p>3. Use of the Ripper</p>	<ul style="list-style-type: none"> ▪ Ripping is reduced tillage using a ripper tine attached to a mould board plough beam. ▪ A ploughshare that is locally available can also be used to open up a planting furrow. ▪ The rip lines are opened at a row spacing of 90 cm and cereals are planted at an inter row spacing of 30cm. ▪ Rip lines should be aligned along the contour. ▪ Available soil fertility amendments are then added to each rip line and lightly covered with soil. ▪ Planting follows after rainwater has collected in the rip line. ▪ All other operations follow the Conservation Calendar

ACTIVITY 7.0: OTHER CONSERVATION AGRICULTURE OPTIONS

Conservation Agriculture Options	Rationale of the options
1. Use of Contours	In conservation Agriculture dead level, contours are encouraged as they help control run off and allow water to infiltrate into the soil. Graded contours are not encouraged as they guide water out of the field.
2. Infiltration Pits	These are pits that are dug in the field and allow water to collect and thus less water is lost through run off. The standard contour drain is designed to divert water from the field, but a lot of water can be harvested in the drain by digging infiltration pits in the contour drain that trap runoff water from the field. These are usually square pits with varying sizes.
3. Potholing	Potholes are dug in the fields to allow water to collect and thus prevent loss through run-off.
4. Cover Crops	These include mucuna, lablab and cowpeas. A system with cover crops and reduced tillage compared with mono cropping cultures with conventional tillage leaves a protective blanket of leaves, stems and stalks from the previous crops on the surface. In this way organic matter can build up in the soil, which has great influence on the activity and the population of microorganisms. Cover crops also prevent direct raindrop impact and sunlight and have a shade effect that suppresses weed growth. Being mainly legumes, they improve soil fertility by fixing nitrogen into the soil.
5. Jab Planters	They have an advantage that they are faster than using the hand hoe and one can apply the basal fertilizer and seed during planting. However, jab planters may only be used for light soils as they tend to clog and block on heavier soils.

ACTIVITY 8.0: BENEFITS OF CONSERVATION AGRICULTURE

The full benefits of Conservation Agriculture (CA) take time and in fact, the initial transitional years may present problems that may influence adoption. Weeds are often a major initial problem that requires integrated weed management over time to get them under control. Soil physical and biological health also takes time to develop. Three to seven years may be needed for all the benefits to take hold. In the meantime, however farmers get the benefits of saving on costs of production and time and usually get better yields than with conventional systems. Basins ensure early planting and better establishment of the crop

Zero-tillage farming with residue cover saves irrigation water, gradually increases soil organic matter and suppresses weeds, as well as reduces costs of machinery, fuel and time associated with tilling. Leaving the soil undisturbed increases water infiltration, holds soil moisture and helps to prevent topsoil erosion. Conservation agriculture enhances water intake that allows for more stable yields in the midst of weather extremes exacerbated by climate change.

While conservation agriculture provides many benefits for farmers and the environment, farmers can face constraints to adopt these practices. Wetlands or soils with poor drainage can make adoption challenging. When crop residues are limited, farmers tend to use them for fodder first, so there might not be enough residues for the soil cover. To initiate conservation agriculture, appropriate seeders are necessary, and these may not be available or affordable to all farmers. Conservation agriculture is also knowledge intensive and not all farmers may have access to the knowledge and training required on how to practice conservation agriculture. Finally, conservation agriculture increases yields over time but farmers may not see yield benefits immediately.

However, innovations, adapted research and new technologies are helping farmers to overcome these challenges and facilitate the adoption of conservation agriculture.

ACTIVITY 9.0: KEY CHALLENGES FOR CONSERVATION AGRICULTURE & MITIGATION MEASURES

Conservation Agriculture is labor intensive in terms of weeding pressure, land preparation, and the lack of ground cover or mulch, with the crop livestock interactions coming to the fore. Some of the main challenges in Conservation Agriculture are as follows:

1. Weeding Pressure

a) Key issues & concerns of weeds	b) Challenges in managing weeds
<p>1. Conservation Agriculture generally increases weeding burden especially in the first years of implementation. For the resource poor households that lack adequate labor and herbicides for weed control, weed control in Conservation Agriculture systems proves to be difficult. However weed management is an important aspect of Conservation Agriculture because</p> <ul style="list-style-type: none"> ➤ Weeds compete with the crop for nutrients, water light and space Weeds result in yield reduction ➤ If weed are allowed to flower, they spread their seeds- this way the seed bank is maintained <p>2. Controlling weeds is vital in conservation agriculture. If one does not control weeds properly, they may take over your field, and one will be left with little or no yield! It is important to control weeds at the right time, before they become a problem. Do not allow them to compete with the crops, and do not let them grow long enough to produce seeds. One may have to slash weeds even after harvesting the crop in order to prevent them from producing seeds</p>	<p>The switch from conventional farming to conservation agriculture is the most challenging time. Many farmers do not realize the importance of controlling weeds, or they may not know how to do it without disturbing the soil.</p> <ul style="list-style-type: none"> ➤ Weeding with hoes or with equipment pulled by animals or tractors is more difficult because of the crop residues or mulch on the ground. ➤ Farmers may be reluctant to use herbicides because of the expense, or because they do not have the right equipment. ➤ Some critics of herbicides say they damage the environment or make people ill. (Herbicides are safe as long as they are used and stored properly.) Farmers may not know how to use sprayers properly, or how to spray the right amount of herbicide
c) Use of Cover crops	d) Mulch
<ul style="list-style-type: none"> ▪ Good cover crops spread over the soil quickly and suppress weeds before they can grow. ▪ Select cover crops that have several uses (food, fodder, fuel wood, etc.), and that produce a lot of green matter that covers the surface rapidly. Cover crops such as cowpea or lablab can cover the soil completely 2 months after planting. ▪ One may have to weed once to give the cover crop a chance to get established. You can also use a post-emergence herbicide after planting maize and the legume to stop weed seedlings from emerging. ▪ If the rainy season is long enough, consider planting the cover crop as a relay crop. It will spread over the soil and smother weeds after you harvest the main crop. 	<ul style="list-style-type: none"> ▪ Weed seeds germinate easily if the soil is bare. Leaving the crop residue on the surface as mulch makes it hard for weeds to grow because they do not have enough space or light. Take care that the mulch does not smother emerging crop seedlings. ▪ Consider bringing in mulch from other fields. This takes more work, but can be worthwhile. The mulch will not only manage weeds, but also reduce soil temperatures, conserve moisture, encourage water to sink into the soil, and add organic matter. ▪ Take care not to bring in mulch that can spread weed seeds! Do not use as mulch plants that have flowered and produced seeds.

e) Crop rotation	f) Intercropping
Planting a different crop on each field breaks the life cycle of weeds. There are fewer weeds, and they are easier to control. A good crop rotation prevents the buildup of weed populations. If you cannot rotate your main crop, try to plant a different cover crop or intercrop each season.	Intercropping helps cover the soil and smother weeds that grow between the rows of the main crop. Choose a crop that spreads quickly and produces a lot of vegetation. Legumes, pumpkins and sweet potatoes are a good choice.
g) Hand weeding	h) Herbicides
<ol style="list-style-type: none"> 1. One could pull out weeds by hand, or slash them with a machete, sickle, slasher or billhook. 2. One could also use a hoe for weeding, but this disturbs the soil surface. Hand weeding is often the job of women and children 3. Advantages of hand weeding: <ol style="list-style-type: none"> a. Uprooting weeds by hand disturbs the soil less than using most types of equipment. Try not to disturb the soil too much if you use a hoe or other implements. b. Hand tools are cheap and can be bought in most markets. 4. Disadvantages of Hand weeding <ol style="list-style-type: none"> a. It is hard work and takes a long time. b. The weeds may re-grow easily. c. The stalks may not be crushed well, making it difficult to plant crops through residue. 	<ol style="list-style-type: none"> 1. In some places, there are not enough people to do the weeding. If this is the case, consider using herbicides. 2. Herbicides are quick and easy to apply, and do not disturb the soil. Some herbicides kill only certain types of weeds. 3. Not many smallholder farmers use herbicides because they are expensive and hard to find. They also need special equipment, such as sprayers or wipers. It is important to use the right amounts of chemicals, mix them with clean water, and handle them safely. If you are considering using herbicides, get training on how to use them the right way. 4. Herbicides can be applied in different ways, namely: <ol style="list-style-type: none"> (i) Weed wiper (ii) Knapsack sprayer (iii) Hand-pulled sprayer (iv) Animal-drawn sprayer (v) Tractor-mounted boom sprayer

2.0 Land preparation

This has been viewed as a difficult exercise as farmers are expected to dig basins in the dry season. This is more so in areas with heavy soils. Related to land preparation, the soil type has effects on some Conservation Agriculture components. For example light soils tillage- digging of basins and water harvesting are not effective. In such soils basins normally collapse due to the nature of the soil and water retention is poor because of the poor water holding capacities of such soils.

3.0 Lack of ground cover

Less than 5 % of Conservation Agriculture farmers that have practiced Conservation Agriculture in Africa have retained crop residues in their Conservation Agriculture plots. The reasons being

- Stover has multiple uses, which include feeding animals, making compost and thatching for some types like pearl millet

- Generally, in the semi- arid areas, there is low biomass production and thus the stover may not be enough to for Conservation Agriculture and other uses
- Most of the farmers, especially the vulnerable have unprotected fields and thus animal graze all the stover in the dry season.

3b Criteria for choosing the right Cover crops

- a) Small-scale farmers prefer a cover crop which fits into their normal cropping system and which has multiple purposes:
 - ✓ Edible seeds and vegetables
 - ✓ Soil fertility
 - ✓ Animal fodder
 - ✓ Firewood/fencing material
 - ✓ Weed suppression
 - ✓ Medicine
- b) First, check which cover crops grow well in your area. This depends on the soil type, rainfall, temperature and altitude. If you live in an area with little rainfall, select a cover crop that grows quickly, such as cowpea, lablab, lucerne, mucuna, or pigeon pea.
- c) Then check how much work each cover crop will need: for land preparation before planting, weeding, and producing and harvesting the seeds. Species with big pods and grains (such as pigeon pea and mucuna) are easier to deal with than species with small pods (such as vetch and grasses). Most farmers prefer species that cover the soil quickly and completely, and which can also be used for food and fodder.
- d) Make sure that the cover crop does not interfere with the main crop. For example, avoid growing a tall cover crop that might shade the main crop. One could also prevent the cover crop from interfering with the main crop by planting it late

ANNEX 1: FIELD TRAINING PHOTOS & DEMONSTRATIONS



1.0 Farmers group orientation in Kibwezi East Ward



2.0 Farmers group orientation in Kibwezi West Ward



3.0 Demonstration of hand planter for precision seed & fertilizer placement



4.0 Facilitator demonstrate hand planter tool application for seed & fertilizer placement



5. Animal Drawn planter being demonstrated



6. Presentation of shallow weeder



7. Shallow Weeder demonstration & application

ANNEX 2: LIST OF PARTICIPANTS

A) KIBWEZI EAST PARTICIPANTS

NAME	ID/NO.	GROUP
1. KITHEKA NZILI	108322688	KYENI CHA NGIINI
2. LINDA JOEL	21590941	KYENI CHA NGIINI
3. MUMBE KITHEKA	375457799	KYENI CHA NGIINI
4. TABITHA PETER	77819508	KYENI CHA NGIINI
5. MARY MBATHA	9064908	KYENI CHA NGIINI
6. MARY PETER	7814968	WASYA UMWE
7. PAUL KYALO	33555766	WASYA UMWE
8. SAMMY NZOKE	33557597	WASYA UMWE
9. JENIFFER MUMO	11163043	WASYA UMWE
10. AGNES KIMANTHE PETER	26924495	WASYA UMWE
11. EUNICE KAMAU	29869948	SAUTI WOMEN
12. CHRISTINE NGINA	35835947	SAUTI WOMEN
13. PETRONILLA WAMBUA	5469371	SAUTI WOMEN
14. ONESMUS KIMANTHI	22467031	SAUTI WOMEN
15. ROSELINE MBUVA	22038293	SAUTI WOMEN
16. ESTHER ISAAC	26924495	MIAMBA MITAMBONI
17. LOISE KASUNI	32797942	MIAMBA MITAMBONI
18. MONICAH MUTHINI	30790789	MIAMBA MITAMBONI
19. ROSE MAKOVU	31855528	MIAMBA MITAMBONI
20. RUTH MWIKALI	7789929	MIAMBA MITAMBONI
21. JOSEPHINE MUNINI	1499326	KIKWASUNI
22. WILSON KIOKO	2978727	KIKWASUNI
23. MONICA MUTUA	6274124	KIKWASUNI
24. GRACE MWIKALI	30789292	KIKWASUNI
25. AGNES MUINDI	5716133	KIKWASUNI

B) KIBWEZI WEST PARTICIPANTS

NAME	ID/NO.	GROUP
1. REBECCA MWANTHI	36628313	NGWATANIO YA MISUUNI
2. ELIZABETH KAMENE	8794487	NGWATANIO YA MISUUNI
3. PAUL KANYOLA	6891405	NGWATANIO YA MISUUNI
4. HELENAH KAIYO	6272895	NGWATANIO YA MISUUNI
5. JOSEPHINE MUTUKU	3365951	NGWATANIO YA MISUUNI
6. VICTORIA MWENDE	33610345	WISE WOMEN
7. ELIZABETH KIMEU	29586552	WISE WOMEN
8. JANE MUMBUA	30565032	WISE WOMEN
9. MARGARET WAVINYA	30666182	WISE WOMEN
10.MARY MUENI	20184267	WISE WOMEN
11.MARY MUINDE	13026696	NEEMA YA MUNGU
12.TABITHA NZUNGULA	21252784	NEEMA YA MUNGU
13.PETER KITHEKA	2027445	NEEMA YA MUNGU
14.CATHERINE NDUNGE	35910622	NEEMA YA MUNGU
15.FELISTA MWANZA	30799283	NEEMA YA MUNGU
16.KAMENE MUSYOKA	7393333	SYOKOYA WOMEN
17.KALEWA NYAMAI	6275768	SYOKOYA WOMEN
18.AGNES NZUKI	6272015	SYOKOYA WOMEN
19.RUTH MUTHUI	26622724	SYOKOYA WOMEN
20.PRISCILLAR MUTHEO	29861840	SYOKOYA WOMEN
21.DANIEL KISILU	32680121	WIKWATYO
22.GEOFFREY KISILU	29870941	WIKWATYO
23.MUEMA KALAI	20293800	WIKWATYO
24.LYDIA MUSYOKI	73515545	WIKWATYO
25.RHODA KITHEKA	8794985	WIKWATYO