RESEARCH PROGRAM ON Roots, Tubers and Bananas

CGIAR



Workshop report:

Enhancing ware potato storage

Critical steps in pre and post-harvest and storage management of potato in field for best ware quality

RTB ENDURE

European Commission

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Enabling poor rural people to overcome poverty

A broad alliance of research-for-development stakeholders & partners

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The CGIAR Research Program on Roots, Tubers and Bananas (RTB) is a broad alliance led by the International Potato Center (CIP) jointly with Bioversity International, the International Center for Tropical Agriculture (CIAT), the International Institute for Tropical Agriculture (IITA), and CIRAD in collaboration with research and development partners. Our shared purpose is to tap the underutilized potential of root, tuber and banana crops for improving nutrition and food security, increasing incomes and fostering greater gender equity, especially among the world's poorest and most vulnerable populations.

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RESEARCH PROGRAM ON
Roots, Tubers and Bananas

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List of Acronyms

BugiZARDI	Buginyanya Zonal Agricultural Research and Development Institute
CGIAR	Consortium of International agricultural Research Centers
CIAT	International Center for Tropical Agriculture
CIP	International Potato Center
CIRAD	French Agricultural Research Center for International Development
IFAD	International Fund for Agricultural Development
IITA	International Institute for Tropical Agriculture
KACOFA	Kapchorwa Commercial Farmers Association
MIFA	Mengya Integrated Farmers Association
NARO	National Agricultural Research Organization
SHA	Self Help Africa
WASWAPA	Wanale Seed and Ware Potato Producers Association

A broad alliance of research-for-development stakeholders & partners

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BACKGROUND

Potato is one of the fastest growing major food security crop in the developing world with important economic impact on many resource-poor farming families. Many factors limit production and profitability, with hundreds of millions of shillings spent yearly on fungicides alone, but little is known about direct losses, with experts agreeing that they are variable and frequently significant. It is estimated that 82 %, 71 %, and 61 % of potato grown in Kenya, Uganda, and Ethiopia, respectively, are for sale and the farming systems are quite intensive and diversified (Gildemacher, 2012). In Uganda, losses caused by diseases such as late blight (*Phytophthora infestans* (Mont.) de Bary) are high, ranging from 40 % to 60 % of the total production and can reach 100 % if infection occurs early in the season when climatic conditions are favorable for disease development. According to Okonya et al., (2016), the constraints to potato production and marketing as ranked by stakeholders include diseases as the most important, followed by insect pests and price fluctuation for ware potato was ranked third most important constraint. Low market prices for ware potato was at fourth, late maturity and short dormancy of some potato varieties, tuber damage by rodents and tuber damage by millipedes were registered.

Seed potato is the most significant constraint to profitable potato enterprise and yet access to quality seed is limited. The potato enterprise in Eastern Uganda is further constrained by the variety of potato grown which does not attract premium price in urban markets. The growing of market demanded potato varieties is key to ensuring improved household incomes. This has to be supported with good agronomic practices that are efficient and ensure good quality of ware for the market. Ware potato production in Uganda is characterized by inconsistent supply which is dependent on seasonal harvests, poor handling, high moisture content, bruised skins, poor packaging and transportation. More importantly from scoping studies, it was shown that there are no attempts to store the surplus appropriately. This has resulted into low prices during times of surplus and peaks when supplies drop. With the introduction of ware potato storage facilities high value potato varieties and good quality at storage will ensure sustained access to the market. The project has introduced ambient storage to the potato producing areas inclusive of the traders. This being a new innovation, skills and techniques for proper ware potato post-harvest and therefore storage need to be provided. Very careful handling is the key to preventing damage. Harvesting is best done when the soil is slightly moist to prevent abrasion and the tubers lifted carefully to avoid damage. Ideally they should be left to dry for few hours in the field, collected in field containers and placed in a cool, shady place. Temperature and tuber damage are the two most important factors in successful potato storage. Potatoes for food (ware potatoes) must not be exposed to light for more than a few hours otherwise they turn green, develop an unpleasant taste and may become toxic.

Potato storage is a critical component of the potato production process, with some crops spending longer in storage than they do in the ground. It follows therefore that potatoes in stores should be afforded a similar level of management input as might be applied to a growing crop. The situation in stores is dynamic; the crop is respiring and reacting to its environment. Store operators must have the capability, in both expertise and environmental control equipment to respond to this change to optimize conditions in the store and maintain quality throughout the storage period.

To obtain the optimum postharvest quality of potato actually begins very early in the farm planning process. The effects of pre-harvest factors on postharvest quality are often overlooked and underestimated. However, many of the decisions that we make during crop production can greatly influence the postharvest quality of crops. It is critical to remember that potato like other vegetable quality is only maintained postharvest – it is not always improved during the harvest and storage processes. Thus, it is of utmost importance to consider the pre-harvest factors that allow us to maximize the quality of the potato post-harvest and going into storage. These factors encompass production and management decisions concerning soil fertility, variety selection, irrigation, and pest management.

Training outcomes

1. Participants are knowledgeable on improved pre-harvest management practices
2. Participants are aware of proper ware potato post-harvest handling practices
3. Participants' are sensitized on ware potato storage management methods

Methodology

The modular approach with a mix of theory and practical aspects was used to conduct the trainings. Participatory learning and action methodology was used for delivering the subject matter. Participants were drawn from each association and workshops conducted within their locality. Technical personnel from Buginyanya ZARDI provided the backstopping during the discussions. Practical sessions were held with each group in nearby fields to the field workshop venue. The discussions where based on participants own experiences then the experts would chip in with innovations to make the process better. Innovation such as localized weather predication combined with scouting for disease symptoms to regulate use of agro-chemicals, attending field days in Kitale, Kenya and using information on their farms especially in seed potato production on farm are key to agricultural development. Realizing the potential of agricultural innovation requires research and extension systems and other knowledge institutions to be stronger and better connected with each other and with farmers and their organizations.

Table 1: Table showing association participation and specific training workshop dates

ASSOCIATION	WORKSHOP DATE	LOCATION	NUMBER OF PARTICIPANTS	
			FEMALE	MALES
KACOFA	12th January 2016 (Pre-harvest training)	Kapchesombe	6	8
	1st March 2016 (Post-harvest training)	Kapchesombe	10	5
MIFA	13th January 2016 (Pre-harvest training)	Mengya centre	5	8
	2nd March 2016 (Post-harvest training)	Mengya, FHI	7	10
WASWAPA	14th January 2016 (Pre-harvest training)	Wanale centre	4	10
	3rd March 2016 (Post-harvest training)	Wanale Baptist church	15	10
MPODA	4th March 2016 (Post-harvest training)	Bugwere Market	4	11
Total			51	62

Best practices in improved potato pre-harvest management

Potato Variety Selection:

Producers should select varieties that are suitable for their location and for a targeted market. The popular marketable varieties in Uganda include Victoria, Rwangume, Rutuku, Kinigi, and recently released Naropot1, NaroPot2, NaroPot3 are currently suitable for dual purpose (fresh consumption and processing) while Nakpot5, Kachpot1 and Wanale/cruza are suitable for boiling only.

Seed Potato Quality

To obtain good seed potato, it is advisable to acquire seeds from a certified source, research station or established potato seed producers. Fields for seed potato production should be of a single variety produced in solaneous crop free locations. Producers can use the positive and negative seed selection techniques for bulking of clean seed. The seed should then be stored in Diffused light stores or modified farmer methods such as covering with grass for proper sprouting. The seed potato contains buds or "eyes" which sprout and grow into plants. Good seed is characterized by having at least one good “eye” of egg size or 40-80gm. Seed potatoes are graded into 2 sizes, 35 – 45mm or 45 – 55mm thus needing giving about 40,000 seeds/ha. Seed potato should be carefully transported in jute bags or other suitable material but not polythene to avoid damage to the sprouts. Properly select the healthy sprouted potatoes and remove any rotten ones and dispose of them properly. Producers can also use small seed plot technique for seed potato production especially if quantities are limiting.

Field preparation and management

A field with no history of potato production for the past 3 seasons and not adjacent to any solanaceous crops is most ideal for current season’s production. The land should have well drained sandy loamy soils, pH 5-6 and stone free. It should be ploughed two times with intervals of 2 weeks to clear out all the previous crop.

Potatoes grow best on raised beds which are made during initial land preparation or immediately after planting. Adoption of raised beds or gradually hilling during weeding after planting as the crop grows leads to improvements in soil moisture, temperature, adequate aeration and drainage which is a vital ingredient for Potato growth.

Organic manure should be spread in the field during levelling. Apply one bag of inorganic (NPK) fertilizer for every four bags of seed potato planted which is equivalent to with at a rate of 300kg/hectare in the ridges during planting.

Seed potato should be placed 10cm below surface of ridge, 60cm apart between rows and 30cm from tuber to tuber in a row. The seed should then be earthed up to make ridges of 25cm depth. This can be done using a planter or oxen with mouldboard plough. Preferably plant a few days before the rains start in late March and Early August then also if you can irrigate, plant in Early November.

Crop should be earthed up at first weeding to cover the roots fully. Earthing up protects the crop from light, light exposure causes greening of tubers and leads to alkaloids (poisonous) forming skins. A second weeding using a selective herbicide should be done at 60 Days after planting. Crops should be sprayed when 15-20% of potato plants are visible above soil, spray should be a mixture of total herbicide and residual herbicide of medium resistance. The total herbicide kills the potato tips but they recover and continue growing. In field the crop should be uniform at flowering with all off types rouged out.

PEST SURVEILLANCE AND MANAGEMENT

The crop should be regularly monitored for aphids, cut worms, leaf miners and other insect pests. Aphids are a major pest in all farming systems. They usually feed by sucking the sap of a plant through the plant veins. All parts of a plant are vulnerable to aphid infestation. Potatoes can be

infected by many different viruses transmitted by aphids and thrips. These can reduce yield and tuber quality. Virus diseases can often be diagnosed by mosaic patterns on leaves, stunting of the plant, leaf malformations, and tuber malformations. The best strategy to control viruses is to use certified seed potatoes, spray insects with mineral oils and pesticides applied at frequent intervals to be effective. Infected plants can serve as a source of inoculum for the rest of the field, so rogue (pull out and dispose of) symptomatic plants. Early detection and monitoring of initial aphid build-up is important. Spraying should only be done when the aphid population is heavy.

Potato tuber moth (PTM) or tuberworm (PTW)

Foliar injury is due to the larvae (tuberworm) mining into leaflets, causing them to form transparent blisters, then move into stem tissue causing death. Tubers are marred when larvae burrow through cracks in the soil to a tuber, entering it through the eye. This is common after vine desiccation. The female PTM lays its eggs directly on exposed tubers at or near the eye. A tunnel can be detected by mounds of worm excrement (frass) appearing black at the entrance. Tunnels do not heal and are entryways for diseases most notably soft rot and dry rot.

DISEASE SURVEILLANCE AND MANAGEMENT

Late blight (LB):

Planting of seed tubers latently infected with Late blight (LB) contributes significantly initiating the disease at field level. LB is most rapid during conditions of high moisture and moderate temperatures (15°-25°C. The disease attacks leaves, stems and tubers. The disease consists of small, pale to dark green spots that change into brown or black wounds, depending on the humidity of the air. Under conditions of high humidity and cool temperature, lesions look water soaked and expand rapidly. It is more damaging during cool, wet conditions. It can affect all plant parts. An infected potato tuber has irregularly-shaped and slightly-depressed brown to purplish lesions on the skin surface.

Management: The most commonly-used fungicide, mancozeb, is effective when applied before the onset of the disease then a systemic insecticide such as Ridomil introduced when symptoms persist. However, most farmers apply fungicides after seeing symptoms. The current farmer practice (6 sprays beginning 30 days after crop emergence) increases potato yields slightly but a weekly scheduled spray program with surveillance (6 sprays) can produce a significant higher yield increase (Namanda et al. 2004).

Bacterial wilt (BW):

This is spread by field infected seed and contaminated soils. The first visible symptom is a wilting of the leaves at the ends of the branches during the heat of the day. As the disease develops, a streaky brown discoloration of the stem may be observed on stems 2.5 cm or more above the soil line, and the leaves develop a bronze tint.

Management: BW can be managed if various control components are combined. This will involve mainly the planting of certified/healthy seed in clean and fertile soil, combined with rotation with non-susceptible crops, and, the application of various sanitation and cultivation practices.

DEHAULMING

The practice of Dehaulming is defined as pulling/ cutting of haulms / aerial parts by hand/sickle or killing by chemicals or destroying by machines. This is done after randomly checking the size of tubers, rubbing the skin to check if it is mature at approximately 75-90 days after planting depending on the variety and when the aerial part of the plant turns yellow due to senescence or should be done at least 14days before harvesting the potato. The purpose of dehalming is to thicken the tuber skin which then hardens and leads to less bruising and scratching on harvesting,

prevent infection of tubers by late blight or viruses through aphids, and reduce internal moisture content for longer stay. The cut haulms should not be left as such in the field. It should be observed that there is no re-growth of stems after dehaulming as tender and succulent leaves are more attractive to aphids.

POTATO POST-HARVEST HANDLING METHODS

FIELD ASSESSMENT FOR MATURITY

The crop is said to be physiologically mature when more than 70% of the flowers have dried and dropped off and 50% of the stems are steadily drying up. Harvesting and storage management in ware potato

The Dehaulmed potato should be harvested using equipment and methods that limit damage to the tubers. Harvesting should be done when the weather is sunny with no chances of rain, but the ground should be moist but not wet. This allows for tubers to be lifted with minimal skin injury and yet the soil doesn't stick to the tubers. This can be done using Ox-drawn digger or tractor lifter as recommended by Wasukira et al. Always harvest the clean unmarked areas first and leave the pegged areas/diseased lots for later harvesting for immediate consumption and not storage. At harvest, tubers are liable to considerable skinning, bruising and other damages, which subsequently lead to rotting if not handled properly.

FIELD SORTING, GRADING AND CURING HARVESTED POTATO

The harvested Potato should then be placed on tarpaulin in a shade, sorted and graded into damaged tubers, marketable tubers and small tubers. Each of these lots should be weighed and the sum recorded per lot. If there is no threat of rain, the potato can be left for a day under shade and minimal light for curing purposes. Potatoes to be stored need to be cured to repair any skin injuries and to promote the formation of a stronger epidermis to reduce water loss. The optimum conditions for curing potatoes are: Temperature: 15° - 20°C, Relative humidity: 85% - 90%, Duration: 5 - 10 days (FAO, 2006). Curing should be carried out near the place where the tubers will be stored to minimize handling after curing. Always dry the harvested tubers quickly to remove excess moisture from the surface of tubers for improving their keeping quality. Always dry the harvested tuber in storage shed, expose to sun causes the greening of potatoes. Do not store the tubers immediately if they are exposed to rain after harvest.

Farmers achieve these conditions in two ways:

Above ground. Tubers are carefully piled on the ground and covered by a layer of grass at least 15 cm thick and finally a canvas tarpaulin or jute bags are used to cover the whole pile. Plastic sheets should not be used and the curing pile should not be exposed to direct sunlight. The cover should be removed after 2-4 days (Knoth, 1993).

Pit-curing. It consists of a pit, approximately 2.5 x 1.5 x 1 metre with the bottom lined with sawdust or dry grass. The potato tubers are placed on this lining and then covered with a thin layer of soil. The treatment takes about two weeks after which the tubers can be removed for storage. Both of these curing methods are dependent on high temperature and high relative humidity. Because these conditions also favour the development of fungi and bacteria. It is advised (Demeaux and Vivier 1984) that prior to curing the tubers should be treated with lime wash or wood ash, or if available, an appropriate fungicide such as thiabendazole or benomyl. After curing the tubers should be handled with care to avoid new injuries.

In store management of tubers

The basic principles of potato storage

In order to get the highest market prices, the quality of potatoes offered for sale need to be protected, and post-harvest handling, storage and transport must be such as to maintain quality to

the highest standard possible. Ware potato storage is aimed at obtaining the maximum quantity of tubers, of acceptable quality to the consumers, at a rate to meet consumer demand. This requires the lowest possible quantitative and qualitative losses, with no or little sprouting, kept in the dark to prevent greening and firm tubers, all at an economical cost (FAO, 2004).

Low storage temperatures, high relative humidity and adequate air flow are the main requirements for potato storage. Storage facilities must be designed to meet the minimum requirements if tubers are to be stored for periods of three months or more. Ware potato storage aims at preventing "greening" (the buildup of chlorophyll beneath the peel, which is associated with solanine, a potentially toxic alkaloid) and losses in weight and quality. The tubers should be kept at a temperature of 6 to 8°C degrees, in a dark, well-ventilated environment with high relative humidity (85 to 90 percent).

Potato variety should be known so as to pre-determine the expected storage length. The variety of potato best for storage is one with a long dormancy. This allows for delayed sprouting and thus better quality after preservation. The crop should be free from diseases, damage or insect infestation.

Temperature influences the rate of respiration of the tubers, sprout growth and the development of microorganisms causing rotting. Most disease organisms multiply very rapidly at high temperatures. Lower temperatures reduce the possibility of disease incidence during storage. This is done by building stores using materials with good insulation properties.

Relative Humidity is a factor that influences/affects the rate of water loss from the tubers. The relative humidity within the store should be kept at sufficiently high levels to reduce water loss from the tubers.

Packaging of the tubers in store should be such that it maximizes air circulation and therefore reduces heat buildup which can lead to rotting. The tubers should be stored in wooden crates, jute bags or on wooden pallets off the walls and ground. Always have sufficient space to walk through the store for regular inspection.

Store sanitation is of great importance at end of each lot or before placing a new lot into the store. Clean the store well with water and disinfectant to kill off any fungus or pests from the previous lot. Always apply a residual spray of a general insecticide such as cypermethrin to the empty store just before harvest to kill any moths in the store.

Well cured potato should be properly parked for storage in an appropriate ware potato store. At farmer level use of improved wooden stores is recommended while large associations can use the ambient stores. The well sorted and graded cured potato should be piled in wooden boxes, jute bags or piled on the floor away from the walls. The potato should be periodically checked for any signs of diseases and pests damage or rotting. The air vents should be properly managed to ensure proper internal temperature and relative humidity to maintain the quality of ware potato. Opening of the store should be limited to avoid sprouting due to light exposure and contamination of the tubers.

Storage options are variable depending on the expected duration, quantity and ability needed for their construction. The four factors to be considered when choosing a potato storage design include style of structure, insulation, ventilation and air requirements. The most common methods of storage include storage in a cool dark room in the house and storage in pits. The two methods are low cost but store limited quantities and for a shorter period. The bulk of potato storage should take place in traditional structures made of mud and bricks or well-seasoned timber. Walls are typically from 2.5 to 3.5 m high and 3 to 5m wide. Storage period is normally for 5 months. Roofs consist of local matting, wheat/barley straw, and iron sheets with a false ceiling.

Large-scale potato storage can include modern facility for warehousing or a smaller unit that runs on natural circulation and cooling. Long-term storage must be designed: - introduce air at 16-18°C for 5 days to stimulate wound healing, b) maintain a high relative humidity to maintain wound healing and prevent drying out, c) reduce temperature gradually to the appropriate holding temperature by removing the heat of respiration, and circulating cool, fresh air through the crop

Record keeping for ware potato in storage

Record keeping is essential to management of the store and the stock therein. Records should be regularly kept to help management in decision making and also for maintenance of the infrastructure. Records such as Date of harvesting, Names of owner, Price at harvest, quantity stored, price at storage, variety, source of stock, quantity damaged, quantity sold and price at time of sale. All records as recommended by Self Help Africa have to be adhered to.

Working Group Outputs

a). Participants knowledge of potato varieties and quality seed production enhanced since at all sites they immediately selected an individual whose potato they would use as seed in the coming season.

b). A set of criteria to follow for pre harvest management of potato for good ware potato quality in storage were agreed as per training given to be monitored by the chairman of the association.

c). Joint monitoring of implementation by the Association committee on quality was also proposed but not fully agreed to due to logistical constraints

Workshop Conclusion

The workshop achieved its targets of introducing proper field potato management and post-harvest management for improved ware potato. Its timing however was not convenient for most participants as it fell when a lot of field operations were taking place thus low attendance for some associations'. Better approach should be scheduled by using the farmer field school technique then learning will be enhanced. Demonstration gardens are also essential to appreciate the effects of poor management on the quality of ware potato for storage. It was also noted that although SHA had introduced the concepts of record keeping and business planning, the associations had not yet fully grasped what was required of them for the project to be fully implemented.

ANNEXES

ANNEX 1. WORKSHOP PROGRAM

Time	Topic	Responsible
08.15-09.45	Travel to the Venues and mobilization	Facilitator
09.45-10.00	Self-introduction and purpose of the training	Mr. Wasukira
10.00-11:00	Preparation of seed potato for field planting	Dr. Owere
11.00-12.30	Field Management practices	Mr. Wasukira and Mr. Wobibi
13:00-14.00	Lunch	
14.00-16.30	Field practice	Mr. Wobibi
16.30-17.00	Discussions	Mr. Wasukira
17.00-17.15	Wrap up for the day:	Chairperson
17.30	Close	

Post-harvest and storage management

Time	Topic	Responsible
08.45-09.45	Introduction of members	Chairperson of Group
09.45-10.30	Purpose of the training	Potato coordinator
10.30-11:00	**Coffee break**	
11.00-12.00	Field activities before harvest	Mr. Walimbwa
12.00-13.00	Field pests and Diseases	Mr. Wobibi
13:00-14.00	**Lunch**	
14.00-15.30	Storage management	Mr. Wasukira
15.30-17.00	Field activity	All
17.00-17.30	Wrap up for the day:	Mr. Wasukira
17.30	**Close**	

ANNEX 2. LIST OF PARTICIPANTS FOR PRE-HARVEST TRAININGS

No.	Name	Location	Gender	Phone
1.	Kiptala Moses	Benet-MIFA	M	0789117972
2.	Cheptai Alex	Benet-MIFA	M	0775405295
3.	Chemutai Juliet	Benet-MIFA	F	0778124877
4.	Lawendi Stephen	Benet-MIFA	M	0776653994
5.	Chele Alex	Benet-MIFA	M	0777268828
6.	Chelangat Philis	Benet-MIFA	F	
7.	Cheptoris Betty	Benet-MIFA	F	
8.	Cherop Immaculate	Benet-MIFA	F	0787419962
9.	Chepkurui Fred	Benet-MIFA	M	0774066860
10.	Bosei Micheal	Benet-MIFA	M	
11.	Chelangat Fred	Benet-MIFA	M	0778147291
12.	Chebet Andrew	Benet-MIFA	M	0392967120
13.	Chemusto Carol	Benet-MIFA	F	0777886380

No.	Name	Location	Gender	Phone
14.	Shiondo George	WASWAPA	M	0712314372
15.	Vincent Kutosi	WASWAPA	M	0774547603
16.	Welishe Stephen	WASWAPA	M	
17.	Wazabegwa Dison	WASWAPA	M	0755943121
18.	Waniaye Yefusa	WASWAPA	M	
19.	Watangwa Wilson	WASWAPA	M	
20.	Shabire Stephen	WASWAPA	M	
21.	Nagudi Janet	WASWAPA	F	
22.	Namugongo Alex	WASWAPA	M	
23.	Muzamiru Kuranica	WASWAPA	F	0713423883
24.	Natiko Stephen	WASWAPA	M	
25.	Khainza Mary	WASWAPA	F	
26.	Mafabi Stephen	WASWAPA	M	
27.	Madina Namudenyi	WASWAPA	F	

No.	Name	Location	Gender	Phone
28.	Cherukut Martine	KACOFA	F	0751881426
29.	Chelangat Davis	KACOFA	M	0782637163
30.	Musani Wilfred	KACOFA	M	0755185205
31.	Sande James	KACOFA	M	0773146171
32.	Chelimo Christine	KACOFA	F	0755501231
33.	Sukuku Beatrice	KACOFA	F	0787314941
34.	Chemutai Beatrice	KACOFA	F	0755131230
35.	Chemutai Susan	KACOFA	F	
36.	Chepkurui Francis	KACOFA	M	0787314730
37.	Chemusto David	KACOFA	M	07723228981
38.	Muneria Joseph	KACOFA	M	0782903007
39.	Chepkurui Jackson	KACOFA	M	0759700608
40.	Twala Satya Edward		M	0787813081
41.	Banan Joyce		F	

ATTENDANCE FOR POTATO POST-HARVEST TRAINING

No.	Name	Location	Gender	Phone
42.	Korir Sam Koja	KACOFA	M	0702761172
43.	Chepkurui Joseph	KACOFA	M	0750520788
44.	Suku Peter	KACOFA	M	0755090245
45.	Chemayek Annet	KACOFA	F	0754676569
46.	Chelimo Kokop	KACOFA	F	
47.	Chekwoti Nancy	KACOFA	F	0755738145
48.	Chekube Joan	KACOFA	F	
49.	Cherop Davis	KACOFA	M	0772625565
50.	Muneria Joseph	KACOFA	M	0752903007
51.	Chemusto David	KACOFA	M	0752398877
52.	Chepkurui Jackson	KACOFA	M	0759700608
53.	Aliwa Justine	KACOFA	F	
54.	Sukuku Beatrice	KACOFA	F	0787314941

No.	Name	Location	Gender	Phone
55.	Wetuga Mary	WASWAPA	F	
56.	Mujjewa Martin	WASWAPA		
57.	Sulaina Makhonje	WASWAPA	F	0713434830
58.	Florence Khabatsa	WASWAPA	F	0741738152
59.	Muzaki Janice	WASWAPA	F	0754578663
60.	Khainza Lorna M	WASWAPA	F	0713436249
61.	Mutonyi Janice	WASWAPA	F	0788823537
62.	Nandudu Juliet	WASWAPA	F	0713784543
63.	Nambozo Phylis	WASWAPA	F	0712039597
64.	Nambozo Mary	WASWAPA	F	
65.	Shakilo Gorret	WASWAPA	F	0712093117
66.	Namutosi Sarah	WASWAPA	F	0775694504
67.	Waniaye Allen	WASWAPA	F	0784141723
68.	Mutenyo Jalia	WASWAPA	F	0789035242
69.	Shiondo George	WASWAPA	M	0712314372
70.	Vincent Kutosi	WASWAPA	M	0774547603
71.	Welishe Stephen	WASWAPA	M	
72.	Wazabegwa Dison	WASWAPA	M	0755943121
73.	Muledi Moses	WASWAPA	M	
74.	Waniaye Yefusa	WASWAPA	M	
75.	Nabuloli Loyi	WASWAPA	F	0759393961
76.	Wamimbi Margret	WASWAPA	F	
77.	Khabatsa Rogers	WASWAPA	M	
78.	Watangwa Wilson	WASWAPA	M	
79.	Shabire Stephen	WASWAPA	M	
80.	Nagudi Janet	WASWAPA	F	
81.	Namugongo Alex	WASWAPA	M	
82.	Muzamiru Kuranica	WASWAPA	F	0713423883
83.	Natiko Stephen	WASWAPA	M	
84.	Khainza Mary	WASWAPA	F	
85.	Mafabi Stephen	WASWAPA	M	
86.	Madina Namudenyi	WASWAPA	F	

No.	Name	Location	Gender	Phone
87.	Kiptala Moses	Benet-MIFA	M	0789117972
88.	Cheptai Alex	Benet-MIFA	M	0775405295
89.	Chemutai Juliet	Benet-MIFA	F	0778124877
90.	Lawendi Stephen	Benet-MIFA	M	0776653994
91.	Chele Alex	Benet-MIFA	M	0777268828
92.	Chelangat Philis	Benet-MIFA	F	
93.	Cheptoris Betty	Benet-MIFA	F	
94.	Cherop Immaculate	Benet-MIFA	F	0787419962
95.	Chepkurui Fred	Benet-MIFA	M	0774066860
96.	Bosei Micheal	Benet-MIFA	M	
97.	Chelangat Fred	Benet-MIFA	M	0778147291
98.	Chebet Andrew	Benet-MIFA	M	0392967120
99.	Chemusto Carol	Benet-MIFA	F	0777886380