TECHNICAL REPORT
(FOSRI)

Project: Improving the livelihoods of small scale rural sweet potato farmers in Central Uganda through a crop post-harvest based innovation system

Activity 2.2: Conduct participatory trials to introduce farmers to suitable post-harvest technologies

1. INTRODUCTION

Participatory trials in sweet potato storage technologies were conducted in districts of Luweero, Mpigi and Kiboga. This involved participation by farmers. The purpose was to introduce to sweet potato farmers suitable storage technologies, and through their participation, to enable them select those which would suit their environment.

During the project period farmers were expected to obtain skills and knowledge in sweet potato post-harvest handling and storage. Subsequently, the farmers would pass the technologies to other farmers. Secondly farmers were expected to monitor the quality of stored sweet potato, and so eventually recommend to other adopters. In addition farmers were expected to conduct a cost-benefit analysis, so that this would guide them to determine the costs involved for a give technology. Farmers would also e introduced to storage technologies of processed sp products including dried chips, and 2o products.

Overall objectives

i. To introduce to farmers sweet potato storage technologies
ii. Farmers acquire knowledge and skills in post-harvest handling and packaging of sp and sp products

2. METHODOLOGY

a) Constraint analysis

Initially all groups were visited with a purpose of understanding farmers' constraints in relation to sp harvest and post-harvest handling, as well post-harvest practices (harvesting methods, pre-harvest constraints, storage, processing and marketing constraints). A focus groups discussion method with participatory rapid appraisal (PRA) was used. Farmers were guided in cases where they failed to agree.

b) Introducing fresh sweet potato storage technologies

A participatory approach with learning and action (PLA) was used to introduce fresh sweet potato storage technologies to all groups. Farmers were trained , given handouts, followed by farmer participatory demonstrations. All groups were introduced to the pit ad clamp storage methods of fresh sweet potato storage with one day of curing after harvest and no use of chemical agents (Anti-sprouting or antibacterial). Sweet potato storage structures were established at 6 sites during which farmers from 11+ farmer groups were trained. Different varieties of sweet potato were

used in trials, depending on availability in the community, marketability and / or acceptability. Varieties included: NASPOT 1, SPK (Kakamega) and NASPOT 2 at Vumba Kalagala; NASPOT 1, SPK, Dimbuka, and Ejumula at Ziroobwe; Ejumula at Nnyimbwa; NASPOT 1, and Semmanda at Nindye (Mpigi); Naspot 1 and Naspot 2 atKibga; and Napsot 1 , Ejumula, SPK, and Dimbuka at Kakuuto-Kiboga district.

c) Quality and acceptability tests

The stored fresh sweet potato was/is to be monitored and tested for quality changes and acceptability by farmers over a period of 3 months. The quality ad acceptability was tested every after 15 days of storage. Sensory evaluation and laboratory analysis were carried out. Sensory analysis was done with full participation of farmers. A descriptive analysis and hedonic rating with a scale of 5 – very good quality and 1 – poor quality/deteriorated was applied.

d) Cost benefit analysis

A discussion method was used. Farmers listed all materials used to construct fresh sweet potato storage structures and estimated the quantities required for a pit which can store 2-3 sacks full of sp or clamp of about the same size capable of storing a full sack). Other inputs required were also mentioned. Farmers also discussed the experiences related to making each type of store so as to give a broader picture of what was involved.

3. OUTPUTS

1. Constraint analysis

Constraints associated with pre-harvest, transportation, marketing, storage ad processing were assessed. It was established that farmers basically have not been practicing any form of storage or processing of sweet potato, apart from farmers in one group (Nnyimbwa) who had been trained in the past by researchers from Kawanda. These practiced processing of primary and secondary products from sweet potato. (*annex -to be attached*)

Farmers' major constraints included: poor access to markets, lack of means of transport, poor infrastructure (roads), exploitation by middlemen, low price offered for sp, lack of means of storage, lacked awareness of any form of processing, animals eat sp at the gardens, weevil damage, lacked vines for new varieties of sp, use of traditional farming methods (the hoe), expensive labour, etc.

Farmers were keen on acquiring new technologies which could contribute to solving some of the above mentioned constraints.

2. Farmers acquired knowledge and skills in fresh sweet potato storage technologies

Farmers were trained in groups of 25 – 41 persons per site. They were equipped with knowledge and skills of fresh sp storage using pits and/ or clamps. In total about 120 farmers have been reached so far with the technologies of fresh sp storage. Technicalities of harvesting, curing and handling of fresh sweet potato for storage

were clearly explained. Farmers practiced curing of one day, and sorting sp for storage.

A recommendation to dehaulm sp prior to harvesting and cure for 5-10 days was given. Though there was no opportunity to practice during the trials.

(pictures will be inserted)

3. Quality and acceptability tests

Farmers assessed the quality and acceptability of sp every after 15 or 30 days (for latter groups). They rated the unpeeled stored sp for appearance, weevil infestation (okuwumba), internal off-colour and flavor due to weevil damage (kawuuzi), sprouting, withering and rotting as indicators of quality changes. Farmers also assessed the peeled, cooked sp for appearance, flavour, hardness or softness, mealiness and ….

Results of the assessment indicated that sp which has not been treated with anti-sprouting agent or a antibacterial agent, would store in good edible condition for two months maximum. Among the varieties stored at the first two sites I Luweero, Ejumula and NASPOT 1 showed higher storability than the varieties SPK (Kakamega) and Dimbuka. (*Results to be attached*) . Farmers who assessed the sp gave additional comments according to their observations. By the second month, Dimbuka was watery on cooking, had been infested by soil pests and was beginning to wither from the edges. SPK at one of the sites (Ziroobwe) deteriorated by the 30th day, which could have been due to poor handling, growth environment or immaturity of the sp. This was estimated at 3 months. SPK from the second site which had been harvested at 4.5 months was edible even by end of three months. However, its quality deteriorated due to weevil damage. Variety NASPOT 2 would have stored longer had it not been poorly handled and stored close to a heap of degrading organic material. Varieties NASPOT 1 and NASPOT 2 turned papery and woody by 2 and half months at Vumba. AT Zirobwe, however some of the roots were still in fine condition (Ejumula and Naspot 1), while others had turned watery by the end of 2 and half months (cooked sp). The storability of fresh sp might have been influenced by the storage environment. This was observed in terms of differences in quality of sp stored in a open space Vumba and that stored within a banana plantation which provided shade at Ziroobwe. (*Pictures to be inserted*)

The storage life of Sweet potato varieties stored at 4 other sites in Luweero, Mpigi, and Kiboga is still being monitored. However a major observation at all sites was sprouting of sp. The best would be to treat all sp with anti-sprouting agent, which however was not used in the trials considering the fact that this is a chemical which is not available on Uganda market, and that farmers would mishandle or misuse. Besides it would be very expensive to farmers.

Farmers generally recommended a storage period of two months from the above trials.

Recommendation: It would be essential to set controls/treat sp with antibacterial and anti-sprouting agents. However this has cost implications.

4. Cost benefit analysis

Cost benefit analyses were conducted with farmers in group at Kiboga and farmers at Zirobwe. Three categories of cost incurrence were described. The findings are as indicated below:

Kiboga district (Tukola community based farmers' group)

Materials/ Inputs	Unit cost (UG. Shs)	Quantity	Total cost (UG. Shs)	Low cost (UG. Shs)	Medium cost (UG. Shs)	High cost (UG. Shs)
1. Poles a) Small to medium size	600	8	4800	-	√	√
2. Small pliable branches	1000	1 bundle	1000	-	√	√
3. Nails	4000 per Kg	¼ Kg	1000	√	√	√
4. Strings	2500	1 pc	2500	√	√	
5. Hoes	4000	1- 3	4000	-		√
6. Spade	-	1	-	-	-	-
7. Dry grass	50	30 bundles	1500	-	√	√
8. Labour	a) 5000 b) 7000		a) 5000 b) 7000	- -	√	 √
9. Craw hammer	3000	1	3000	-	-	-
10. Panga	3500	1	3500	-	-	-
TOTAL				**3500**	**15800**	**21800**

(b) Cost estimates for Ziroobwe (Tusitukirewamu famrers' group)

Materials/ Inputs	Unit cost (UG. Shs)	Quantity	Total cost (UG. Shs)	Low cost (UG. Shs)	Medium cost (UG. Shs)	High cost (UG. Shs)
1. Poles b) Medium size c) Small size	 1000 600	 4 4	 4000 2400	 - -	 √ √	 √ √
2. Small pliable branches	2000	1 bundle	2000	-	√	√
3. Nails	4000 per Kg	¼ Kg	1000	√	√	√
4. Strings	2500	1 pc	2500	√	√	√
5. Hoes	4000	1	4000	-	-	√
6. Spade	-	1	-	-	-	-

7. Dry grass	a) 70 b) 100	30 bundles	2100 3000	- -	√	- √
8. Labour	a) 5000 b) 7000		5000 7000	- -	√ -	- √
9. Craw hammer	3000	1	3000	-	-	√
10. Panga	3500	1	3500	-	-	-
TOTAL				3500	19000	28900

Note: Assumption was made that some of the materials (metallic) would be available at all homesteads (in categories – low cost and medium cost).

The costs calculated above show that it would be worth and more profitable to construct the storage structures at homesteads using family resources (labour, plus other inputs). A farmer would realize benefit right from the first time of storage if he/she belonged to the category of 'low cost'. On the other hand, it was established that a large percentage of the costs incurred above is for a hut which can be used over long term, i.e. several batches of sp stored. It would not be necessary to make a store hut each season. A hut can be used probably for 3 – 4 times . Thus costs would be reduced if a farmer practiced storage every season. This implied that if a farmer of category (B) or (C) stored sp in the following seasons, s/he would incur money to buy grass (10 –15 bundles) or possibly part of labour costs only.

4. MAJOR CONSTRAINTS

(i) Farmers lacked commitment to project activities. This could be attributed to social problems and household responsibilities.

(ii) Institute vehicle had mechanical problems. We had to depend almost totally on the project vehicle for all activities.

(iii) Failure to obtain funds timely at the Institute. This was a constraint to several partners. Thus it was decided that funds would be obtained directly from the Managing partners' office.

(iv) Farmer leaders sometimes did not delegate responsibilities. As a result, materials collected were not enough. This caused delay or failure to complete work planned at two of the sites.

5. INCENTIVES OR DISINCENTIVES

(1) Farmers lacked motivation. It appeared farmers had not been sensitized well enough right from the beginning about the project. Secondly, farmers always look forward to earning from projects. Few of the farmers committed their time and continually participated in project work up to the end of three months.

(2) Farmer leaders failed to allocate responsibility to group members. Even where they tried, there was often failure (e.g. Nyimbwa and Nindye groups). Possibly there was also a tendency of farmer group leaders not to publicize the funds offered for the work.

(3) Farmers also seemed to lack good will for each other. Among many groups, there was not really good spiritual relationship between the group leader and the farmers. This was more captured during lengthy talks involving encouraging farmers to grow new varieties of sp (e.g. Ziroobwe group at farmers expected to obtain free vines from the farmer leader, etc.).

6. LESSONS LEARNT/RECOMMENDATIONS

(a) It is always important to communicate (inform) farmers of intended programs and mobilize them early enough for any project activity. Partners should ensure that they do not destabilize farmers by engaging them in crash programs.
(b) Farmer leaders and fellow farmers need to be sensitized about team participation. Even though farmers were in group, they lacked a team spirit of work.
(c) During future work, funds will be publicly offered to the groups unlike previous approach of requesting the farmer leader to mobilize fellow farmers for the work. In addition responsibility will be assigned to members immediately before parting from the group(s).

7. INSTITUTIONAL BENEFITS

(i) Conducting activities with farmers in the field has exposed us a lot to farmers' own practices and beliefs, and to indigenous knowledge in sweet potato production. There was opportunity to share ideas.
(ii) During the same period, we have had interaction with scientists/partners from different field, thus sharing knowledge.

8. NEXT ACTIVITY PLANS

1. FOSRI will introduce to farmers dry sweet potato storage technologies
2. Farmers will be sensitized/trained on quality aspects, and handling of sp for storage and or export (FOSRI, MAK-FST, HORTEXA, CIP, PRAPACE)